Event Report

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Report of the Second International Workshop on Horizon Scanning for Plant Health

European Food Safety Authority (EFSA), French Agency for Food, Environmental and Occupational Health & Safety (ANSES) and European Commission – Joint Research Centre (JRC)

Abstract

This report is dedicated to the Second International Workshop on Horizon Scanning (HS) for Plant Health, held on 11-13th February 2025, at the ANSES headquarters in Maisons-Alfort, France. The main objective of this second workshop was to collect needs, priorities, and expectations from plant health risk managers in the field of HS and to start establishing the first plant health community on EIOS (the web-scraping and collaboration system for public health decision-making, managed by WHO and JRC). The event was attended by 16 representatives of European Union (EU) national authorities, 8 of non-EU institutions (Africa, Argentina, Australia, Canada, UK, US) plus representatives from DG SANTE, IPPC (FAO), WHO, CABI, EPPO, WOAH, for a total of 41 people. During the two full days meeting, presentations were delivered to and by participants, a training on EIOS was provided and a series of activities were performed in order to understand the relevance of HS initiative and how it could be improved. A number of take-home messages from the workshop are summarized at the end of the report.

Keywords: web-scraping, preparedness, emerging threats, environmental scanning, risk ranking

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Summary

Since 2017, the European Food Safety Authority (EFSA) is mandated by the European Commission (EC) to conduct horizon scanning (HS) activity in the field of plant health. This activity is performed in collaboration with the Joint Research Centre (JRC) of the EC and the French Agency for Food, Environmental and Occupational Health & Safety (ANSES). Its aim is to capture signals from the web about potential threats caused by plant pests from all around the world and to convey them to EU risk managers in order to support their preparedness and timely reactions. This activity has delivered more than 130 newsletters, three technical reports and one event report. ANSES has been awarded with a grant to support EFSA with scientific and technical assistance on HS from 2022 to 2026 "in view to crisis preparedness on plant health for the EU territory (GP/EFSA/PLANTS/2022/07)", that includes a series of workshops and webinars with the aim of supporting communication and dissemination of the HS approach and of building a community of risk assessors and risk managers involved in such activities.

The First International Workshop on Horizon Scanning for Plant Health was held on the 9-10th April 2024 in the headquarters of ANSES (Maisons-Alfort, France). This first occasion allowed risk assessors and, more in general, experts on invasive species and plant pests to share experiences and map current knowledge and practices devoted to identifying emerging threats. One of the main conclusions of the event was the need to involve decision makers in the identification of the most suitable tools and methods to support timely action with horizon scanning techniques.

Therefore, the Second International Workshop on Horizon Scanning for Plant Health, reported here, was targeted at risk managers. The event was held in the headquarters of ANSES on 11-13th February 2025 and focused on risk managers' perspectives and needs. This report provides the main content and outcomes of the workshop, the list of participants, the agenda, brief summaries of the contributions by keynote speakers and other participants, content of the group discussions, and conclusions with future perspectives. A self-evaluation of the event was performed by the participants.

The outcomes from both events will be used in a third workshop that will be dedicated to the concept of "risk drivers": exploring how factors influencing future pest invasion events should be considered. Finally, a fourth and last workshop will be held in 2026 to define collaboratively the most effective practices and future priorities for HS.

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Introduction

Since 2017, the European Food Safety Authority (EFSA), at the request of the European Commission (EC), has been conducting horizon scanning (HS hereinafter) in the field of plant health. This initiative is carried out in collaboration with the Joint Research Centre (JRC) of the EC and the French Agency for Food, Environmental and Occupational Health & Safety (ANSES). The primary aim is to capture web signals from media and scientific literature about potential threats caused worldwide by plant pests. These signals are summarized in a monthly newsletter, highlighting the most relevant ones to EU risk managers, in support of their preparedness and timely reactions.

In the context of the partnership renewed between EFSA and ANSES from 2022 to 2026 (EFSA Art 36 grant GP/EFSA/PLANTS/2022/07), a series of workshops and webinars have been planned. Their objectives are to: (i) support the dissemination of the EFSA HS approach; (ii) ensure the timely communication of HS results; and (iii) strengthen global HS in Plant Health by initiating a worldwide community.

This workshop is the second of a series of four that are planned to be held between 2024 and 2026 and is meant to bring together researchers from academia and risk assessment across the EU and also from overseas, to understand the diversity of activities and methods that can be identified as HS and to start discussions on the necessity of a HS community, enriched by the different approaches and experiences. This second workshop focused on risk managers' needs and expectations from HS initiative.

Currently, the HS outputs are monthly summarized within a newsletter published in the EFSA Journal[1] and in an interactive dashboard[2] on the EFSA website. Additionally, a fast risk screening (PeMo) is performed on pests identified for the first time during the HS activity and not appearing in any official list (i.e. European quarantine lists and EPPO lists): the results are included in both the newsletter and the dashboard. The information is gathered using EIOS platform, where the international Plant Health community is being developed. These outputs and tools were presented to the participants in order to receive feedback and to broaden the community.

More specifically, during the two full-days meeting, presentations were delivered to and by participants, a training on EIOS was provided and a series of activities were performed in order to understand the relevance of HS initiative and how it could be better shaped to maximise its effectiveness.

Later in the year 2025, bringing together the outcomes from both events, a third workshop will be organised to identify and discuss the main drivers supporting biological invasions, and in which way they should be integrated in the HS activity.

A final workshop will be held where, collaboratively within the established community at that time, the most effective practices and priorities for HS will be further defined and fine-tuned.

This report includes the list of participants, the agenda, presentations from keynote speakers and other contributors, the main topics discussed, and conclusions with future perspectives. An auto-evaluation of the involvement of the participants in the HS was conducted during the event. Bringing together various tools, methodologies, and perspectives will help map current HS activities and serve as a basis for creating a cohesive community of experts in HS for plant pests.

[1] All horizon scanning newsletters are freely available at the following link

[2] The horizon scanning dashboard for plant pests is freely available at the following link

Objective of the workshop

The Second International Workshop on HS for Plant Health aimed to provide an opportunity for risk managers to share experience, knowledge and explore innovative approaches related to HS in the context of plant health and biological invasions.

The workshop attendees were engaged and stimulated to actively participate and bring added value to the event. The intention was therefore to create the best conditions to allow participants to network, to identify commonalities and differences, to express their needs, and discuss methodologies and results.

The final objective of the event is to identify a set of actions and goals in support to a further evolution of the HS activity currently performed by EFSA, JRC and ANSES and to set the scene for the foundation of the first Plant Health community on the EIOS platform. This community's main purpose will be to facilitate the sharing of knowledge, outcomes, and best practices obtained from HS and, on the longer term, ensure visibility to the plant health component within One Health initiative.

The identification of interested members and their engagement are essential to the success of the plant health community.

Participants

The event required the participation in person for attendees, to facilitate interaction among invitees, speakers, organisers, in particular during practical sessions. The event was co-organised by EFSA and ANSES, hosted by ANSES and chaired by JRC. The speakers were chosen from the audience or targeted for their involvement in HS initiatives to share their perspective on practices and tools, from national and international organisations for EU or beyond.

The audience was composed of:

- Risk managers from 20 National Plant Protection Organisations (NPPOs), 1/5 of which from extra-EU NPPOs
- Representatives of 1 Regional Plant Protection Organisation (RPPO)
- Representatives of 6 international organisations and networks (i.e. Africa CDC, CABI, Euphresco, IPPC, WHO, WOAH)
- Representatives of 2 national organisations
- Representatives of the EC (i.e. DG SANTE and JRC)
- Representatives of EFSA

In Appendix A, the full list of participants, with affiliation and role during the event, is provided.

Presentations and summary of the discussions

The presentations delivered during this workshop are summarised below and the material shared by speakers is accessible from the same link where this report is stored, under the community "Knowledge Junction" of Zenodo: https://doi.org/10.5281/zenodo.15696755

Horizon scanning practices:

Philippe Reignault – ANSES/Head of the Plant Health Laboratory & Scientific Director for Plant Health – From outbreaks to anticipation & vice versa: A short overview of the ANSES missions in parallel with Horizon Scanning – A focus on forest tree health

Topic: Pest risk assessment by ANSES with a focus on forest health

Summary: ANSES plays a major role in France in supporting risk managers with a diversity of missions including research, support to pest surveillance, and risk assessment. The forestry pests to be taken into account in France can be endemic, established and invasive. Within this last group, the successful eradication of *Anoplophora chinensis* and *Anoplophora glabripennis* insects (two priority pests) is worth mentioning, and the confirmed and strictly monitored absence of the fungus *Bretziella fagacearum*.

Among the most relevant efforts in support to preparedness against forestry pests, the following projects were mentioned:

- PORTRAP, for the use of generic traps for early detection of xylophagous insects in France using an experimental trapping design set up across France (ports, airports, national wholesale markets, etc.) in order to further categorize randomly detected pest pathogens from woody plants of forests and any other green areas.
- SORE INsecte SPOREs, a generic surveillance project for regulated and emerging pests (SORE being the acronym for "surveillance des organismes réglementés ou émergents") on the French territory. It attempts to detect quarantine fungi and oomycetes through metabarcoding of DNA extracted from insects captured by large spectrum traps. This activity is supported by the French Epidemiological Plant Health Surveillance Platform, which was created by the French Ministry and ANSES is part of the platform management committee.

A fundamental support to national policy makers and stakeholders is given by the French Epidemiological Plant Health Surveillance Platform, where public and private institutions jointly provide high-level expertise in plant health. This platform provides advice (e.g. working groups on quarantine pests) and tools for epidemiological intelligence, surveillance of the territory, risk mapping, etc.

Keywords: early detection, risk management, surveillance.

References:

ANSES, 2023. AVIS de l'Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail relatif à « la catégorisation *de Xylotrechus chinensis* ». Saisine n° « 2023-SA-0028 ». Available from https://www.anses.fr/fr/system/files/SANTVEG2023SA0028_0.pdf

Farigoule P, Foncelle A, Michel L and Quillévéré Hamard A, 2023. The French Epidemiological Plant Health Surveillance Platform. An innovative approach to improve surveillance efficiency. Conference poster. Available from https://anses.hal.science/anses-04517276v1

Nicolas Lévêque – European Commission DG SANTE/Policy Officer – Horizon scanning, Background and use

Topic: The European Union (EU) Plant Health Law with a focus on HS use

Summary: The European Union legal framework is established by the EU Plant Health Law (Regulation (EU) 2016/2031), complemented by its delegated and implementing acts. The approach of this legislation is preventive and takes the main risk drivers of this era into account: i) global trade and movement of plants, ii) climate change and environmental factors, iii) human activities.

Anticipating risks is the most effective way to limit pest management costs: horizon scanning plays a major role as it helps i) sorting out the most relevant information available from the web and ii) assisting decision–makers in establishing priorities for action. The EC and Member States receive and discuss the main content of EFSA HS Newsletter and EPPO Bulletin during the monthly Standing Committee on Plants, Animals, Food and Feed – Section Plant Health, through which they can identify new threats to be considered.

In support to preparedness, more actions are ongoing, such as EFSA multi-year and multinational Plant Health Campaign, 'PlantHealth4Life', that aims at raising collective awareness to the European citizens about risks to plant health and about the role each one of us has to play to protect plants.

Keywords: climate change, globalization, legislation, plant health.

References: EFSA, 2024. PlantHealth4Life. Available from https://www.efsa.europa.eu/en/plh4l [03 June 2025].

Camilo Beltran – IPPC/Agricultural Officer – Background information on strengthening Pest Outbreak Alert and Response Systems (POARS)

Topic: Early warning initiative for plant health by the International Plant Protection Convention (IPPC)

Summary: IPPC community works on protecting plant health globally. The IPPC Strategic Framework 2020-2023 provides a development agenda in eight points: i) harmonization of electronic data exchange, ii) commodity- and pathway-specific ISPMs, iii) management of e-commerce and courier mail pathways, iv) developing guidance for the use of third-party entities, v) straightening pest outbreak alert and response systems (POARS), vi) assessment and management of climate change impacts on plant health, vii) global phytosanitary research coordination, viii) diagnostic laboratory network.

Of particular relevance for this workshop, POARS is a four-phase initiative focusing on prevention, preparedness, response, and recovery. It is coordinated by 11 members, among which EC and CABI, with the role of identifying emerging pests of global concern, alerting the IPPC community and stakeholders, and supporting countries in prevention, preparedness, response and recovery. HS is not part of POARS actions yet and could be concretely implemented within the context of EIOS community.

To reach its goals, POARS will determine which emerging pests are of global concern through an identification process. Combined with HS activities, NPPOs, RPPOs, researchers, international organizations and stakeholders can nominate pest of potential global concern. Then, POARS steering group evaluates the pests for a set of criteria (e.g: known distribution, economic and environmental impacts, likelihood of introduction), as a pest management exercise. This leads

to a pest classification: i) "emerging pest", for which POARS activities are required (reporting, prevention, preparedness, response), ii) "potential emerging pest for watch list" that need to be monitored because of data uncertainty, and iii) "non-emerging pest" that do not need to be monitored. To initiate and launch the POARS initiative, a call for nomination of potential emerging pests of global concern will open in 2025.

The IPPC Monthly Pest Reporting Summaries were launched in January 2025 to improve timely reporting of pests of relevance for the contracting parties. These summaries are part of the Global Alert System for Emerging Pests, whose goal is to foster phytosanitary actions and reduce the introduction and spread of emerging pests. Alerts will be issued when a pest is identified; and when an outbreak or a change in biological/ecological data or host range is reported. Gathering national and regional reports would improve these summaries.

POARS initiative is connected to other IPPC initiatives and tools, such as the Phytosanitary Capacity Evaluation (PCE), that provides guides and training materials to improve implementation of ISPM and the convention (IPPC). The PCE process identifies gaps in national phytosanitary systems, and how to improve the situation. The output of the process is a Phytosanitary Capacity Development Strategy, resulting for example in a revision of the plant health legislation or regulation. IPPC Secretariat is also working on launching the IPPC Plant Health Campus (March 2025) to provide guides and training material online to help plant health officers, in developing/enhancing the training programmes from NPPO's staff (new or existing).

Keywords: community, cooperation, IPPC, POARS.

References: IPPC, 2022. POARS. Available from https://www.ippc.int/en/core-activities/capacity-development/programmes/strenghtening-pest-outbreak-alert-and-response-systems/ [03 June 2025].

Topics of questions: New outbreaks of fruit fly in America; criteria for emerging pests; difficulty to assess emerging pests at global level; efficiency of early detection in responding to an outbreak; definition of early detection and its variability based on the pest groups (insect vs. microorganisms); for some pests, problems of eradication after establishment; early warning systems as a prioritization tool; vectors surveillance.

Yahya Kandeh– Africa CDC/ Technical Officer, Surveillance and Rapid Response – Overview of One Health in Africa

Topic: One health approach for Africa CDC

Summary: Africa CDC (Centres for Disease Control and prevention) is an autonomous institution of the African Union with the mission of strengthening Africa's public health institutions capacity to prevent, detect and respond to public health threats and outbreaks. Inside the Africa CDC institution, the One Health unit is promoting a collaborative and multisectoral approach to public health. This approach is operationalised through four programmes:

- Zoonotic Disease programme: supports Member states in adopting and implementing the framework for One Health practice in National Public Health Institutes (NPHI) to work against the increasing zoonotic outbreaks. The programme provides strategic direction and coordinates the control efforts against zoonotic diseases on the African continent, for a more effective public health emergency preparedness and response. This is done by improving the surveillance system and data-sharing processes, strengthening laboratory systems and networks for early detection and response to priority zoonotic diseases.

- Antimicrobial Resistance (AMR) programme: aims at improving AMR surveillance, delaying their emergence, limiting their transmission and mitigating harm in affected human populations.
- Food Safety programme: aims at improving the prevention and control efforts through strengthening the food safety governance, regulation and standards, surveillance, response, regional and international cooperation, consumer awareness, as well as monitoring systems.
- Climate Change programme: aims to develop a cross-sectoral approach to mitigate climate change effects that exacerbates the public health challenges caused by threats such as vector-borne diseases, waterborne diseases, food security and disaster responses.

Due to the multiplicity of actors and disciplines, the One Health approach requires collaboration and coordination at country, region and continent-level, for the political and scientific sides of the project. There is also a need to ensure equitable access to resources, skills and capacity as well as to address the risk of returning to a business-as-usual status once a punctual crisis is over.

Moreover, inside Africa CDC, the Epidemic Intelligence, One Health and Data Monitoring Units are all dealing with different aspects of surveillance: there is a need for Africa CDC to establish partnerships to help building its HS capacity.

Keywords: antimicrobial resistance, climate change, collaboration, One Health, zoonosis.

References: Africa CDC. Available from https://africacdc.org/ [03 June 2025].

Topics of questions: Used of EIOS for human and animal health. Incorporation of vector control, as they are determinants of outbreaks and sanitary issues on human, animal and plant health.

Brendon Reading – DAFF/Assistant Director – Second International Workshop on Horizon Scanning for Plant Health, an Australian perspective

Topic: Australia's horizon scanning assessment process

Summary: The Australian Department of Agriculture, Fisheries and Forestry (DAFF) is over 5,000 head strong, divided into four main groups. Plant health sits within the Biosecurity, Operation & Compliance group and is managed within the areas of "Plant Protection & Environmental Biosecurity" and "Biosecurity Plant & Science Services". These areas are responsible for import policy and pest risk analyses, involving experts in different fields (e.g. entomologists, plant pathologists, diagnosticians).

Australia has seen an increase in pest pressures at the international border. The pressure can be divided into three key themes: i) The cargo and hitch-hikers pests that contaminate goods before being imported or that are outside parcels and containers, ii) The movement of pests through Torres Strait Islands into Northern Australia, iii) and the increase in global trade. Different measures are implemented to mitigate these risks such as surveillance, control of pest movements and regulation updates for new pests, new pathways and new hosts. For example, there is a seasonal eradication programme for fruit flies in the Torres Strait Islands to monitor the insect, implementing eradication measures when it is detected to avoid its arrival to mainland Australia.

Across Australia, there is the National Priority Plant Pest list (NPPP) of over 100 species identified as targets for preparedness activities, and over 400 High Priority Pests (HPP) identified by

industry groups as threats to them. To monitor these pests, DAFF uses different HS resources: i) an internal web-scraping tool for open-source intelligence (Intellriver source (IBIS)) providing key journal articles related to keywords; ii) the APHIS Pest Lens reporting tool; iii) the EFSA HS newsletter; iv) an internal DAFF newsletter to find media articles from Australia; v) and broader literature research using PubMed and Google Scholar to look for emerging risks. The information found during the HS activities is integrated into DAFF Changing Biosecurity Risk (CBR) process, a portal used by staff to receive, record, and analyse information to determine if any actions are required to address the evolving risks. This way, Australia's import policies remain fit for purpose. To trigger a CBR assessment for a pest, certain criteria need to be met: i) a new host for a NPPP or HPP; ii) a new record of quarantine pests on commercial crops or native plants; iii) a potential new quarantine pest; iv) a new pest strain with increased risk; v) a change in pathways, involving one or more new pathways not currently managed; vi) a change in global distribution of the pests. In the CBR workflow, submitted items are rejected or approved to open a case according to the criteria and availability of information. After a summary assessment of all the submitted information, a recommendation is given for: action/no action/continue monitoring of the pest. To showcase the process: in May 2024 a new disease of pears in China was identified. *Pyrus betulifolia* nursery stock was considered an entry pathway for this pest, but no further action was required as the risk is already managed by current import conditions of quarantine and visual screening of all *Pyrus* spp. nursery stocks.

Keywords: DAFF, monitoring, pest pressure.

References: /

Topics of questions: Time frame from CBR assessment to produce a recommendation; involvement of the private sector in biosecurity risks and their contribution in CBR process; quantitative changes in pathways or traits evolving that increase the risk or help to identify the new risk; management on different states with different structures for pests (e.g.: regulation in Tasmania vs. Australia).

Josh Persi – CFIA/Science specialist– Quantitative Horizon Scanning

Topic: Bring empiricism and quantitative rigour to HS

Summary: The Canadian Food Inspection Agency (CFIA) works to reduce biological and pest invasions costs. A study from Turbelin et al. (2023) shows that biological invasion and natural hazards damage costs are similar, underlining the need to avoid these invasions. The best measure against biological invasions is prevention, which is often the easiest measure to implement, at a stage where most damage can be avoided. This is one of the reasons to undertake HS activities. Adding quantitative analysis to HS is a way, to easily compare potential risks between pests, to identify taxa species with a potential to be a threat to Canada, that might have escaped risk assessor's vision and to identify the pests before they arrive at the country borders. This quantitative HS process at CFIA is at a preliminary stage (forthcoming publication), to be integrated in CFIA pest risk analysis workflow.

The following are examples of data sets used by CFIA for quantitative horizon scan: Climate data for Canada, species occurrences pulled from GBIF (Global Biodiversity Information Facility), species trait data related to spread ability, species pathways, impact on ecosystem services and Canadian trade. All this information can be divided into four categories: geographic potential, establishment and spread potential, entry potential and impact potential. All these categories are then summated into a final risk score for each evaluated species. The method also allows to create visualisations of changes in number of potential pests across Canadian territory. With the

example of invasive grass from the Poaceae family, 6,800 taxa were pulled from GBIF and analysed with the quantitative horizon scan. It is possible to draft a list of top-risk score species identified by the quantitative horizon scan. The shortlist can then be passed to risk assessors to review for a formal pest risk analysis, categorisation and possible risk assessment if needed.

In short: Quantitative HS goals are to identify gaps in biosecurity (perspectives) with prioritized pest lists and areas under current or future risk of biological invasion.

Keywords: biological invasion, prioritisation, quantitative horizon scanning.

References: /

GBIF: The Global Biodiversity Information Facility (2025). What is GBIF? Available from https://www.gbif.org/what-is-gbif [03 June 2025].

Turbelin AJ, Cuthbert RN, Essl F, Haubrock PJ, Ricciardi A and Courchamp F, 2023. Biological invasions are as costly as natural hazards. Perspectives in Ecology and Conservation, 21(2), 143-150.

Topics of questions: human component in the process (e.g.: checkpoints or safety nets); validation of datasets and what kind; different taxa group as a cycle or by priority; possibility to share ontologies; distinguish the risks coming from the exchanges of Canada with United States through their shared border and the sea trade.

Godshen Robert – Center for Integrated Pest Management NC State University/ Assistant Director – Exotic pest early warning systems & preparedness activities

Topic: Early warning systems and preparedness activities of United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS)-Plant Protection and Quarantine (PPQ)

Summary: PestLens provides early warning information about pest activities outside the borders of the United States. The team screens about 400 journals per week, looking for relevant information in entomology, plant pathology, nematology and weed science. The output is a series of PestLens articles covering topics such as new pests, new hosts, new locations or new identification techniques, along with relevant references. After each article is released, the Emergency Pest Working Group meets to decide whether to act on specific topics. Actions include adding new pest data to the global pest database so that all analysts working on pest risk analysis have access to it. Another action is to determine if the new pest, host or location report indicates that some existing trade pathways now have a higher likelihood of new pest introduction.

Another project in the early warning system is the Automated Information Retrieval and Analysis (AIRA) system which started in 2023. While PestLens primarily obtains information from journals and publications, AIRA collects data directly from web sources such as IPPC, EPPO reports, the EPPO database, NAPPO PestAlerts, social media, and citizen science databases like GBIF and iNaturalist. The AIRA system then processes this information in local Large Language Models (LLM) and outputs new hosts and new pest locations.

After PestLens and AIRA collect information about pest activities outside the United States, that data is fed into another system that assesses the potential impact of these pests upon introduction into the country. The system categorises potential pest impact as high/moderate/low. After prioritisation, pests with high to moderate impact are added to a National Priority Pest List, enabling all states to focus resources on detection surveys targeting these pests.

Another team works on developing comprehensive pest datasheets and preparedness documents that inform end users about the pest biology, identification and spread, as well as best approaches for delimiting and eradicating them upon detection.

The Delimitation Survey Export System (DSES) is another project under development, which allows users to develop trapping or visual survey design to delimit and eradicate newly introduced pests.

Keywords: action plans, artificial intelligence, data collection, early warning, impact assessment, pest database.

References:

iNaturalist (2025). Available from https://www.inaturalist.org [03 June 2025].

USDA-APHIS, 2025, available from https://pestlens.info/ [03 June 2025].

Topics of questions: trapping design, reliability check on used sources, criteria implemented in the Pest Impact Assessment and Prioritization project.

MaryLucy Oronje & James Cullum – CABI/Senior Scientist & Content and Data Analyst – From Horizon Scanning to Risk Management

Topic: CABI's process for Horizon scanning and Pest Risk Management

Summary: CABI is a non-for-profit organisation focusing on food safety, nutrition, climate change, biodiversity, and international development, with 48 member countries. CABI maintains an extensive portfolio of research and publishing products, including CABI Compendium, knowledge and support tools, such as the Horizon Scanning Tool and Pest Risk Analysis Tool.

PlantwisePlus is a programme running from 2021 to 2030, with the aim of supporting farmers and policymakers to enhance risk preparedness, favouring environmentally sustainable and socially equitable agricultural practices. HS has been performed at the national level (e.g. Kenya, Ghana) with plans to extend the work at the regional level (e.g. West Africa, East Africa) to identify pests with a high risk of introduction in those areas. CABI is also part of the EUPHRESCO III project on Phytosanitary Research priorities for Africa, to enhance collaboration between African countries and research on quarantine pests risk management and contingency planning. The outcomes of these activities are included in the Global Agricultural Research Archive (GARA).

HS outputs have allowed the development of country- or area-specific Pest Risk Registers (PRR) to support targeted actions to specific pests (e.g. risk assessment, surveillance, etc). In addition, CABI provides supporting role in risk analysis and management at a regional level, as is the case with the Association of Southeast Asian Nations (ASEAN) region. This work will also be expanded to African regions, and to continental scale.

NPPO Risk Register working groups have been set up in several countries, which are responsible for decisions about the composition and amendments to each PPR and the associated pest lists, as well as any management recommendations to be made following receipt of HS output.

Pest Risk Monitoring (PRiM) reports are based on the PRR and automatically generated from HS activity on EIOS: the articles are extracted from a dedicated board that feeds a Machine Learning Model to filter relevant content. The model was previously trained with manually curated articles, and extracts articles based on keywords and a confidence score for the inclusion or exclusion of the article in the reports. PRiM reports are created based on PRR pest lists and provided to Risk Register working groups for continuous information and feedback.

Alongside the PRiM and PRR work, CABI has also explored prioritization of pests using Self-Organising Maps (SOMs), an artificial neural network that use clustering technique to classify high dimensional data (species lists and their presence in different regions – based on CABI Distribution Database) into a two-dimensional space. Regions with similar pest assemblage cluster together in the SOM, and at the end of the process each pest gets a ranking score representing its risk for the different countries.

CABI's objectives are to continue to build capacity on pest risk prevention, HS and pest risk monitoring by improving the tools and expanding CABI's reach to other developing countries. In the EIOS Plant Health (PLH) Community, CABI looks forward to continued development and collaboration with other members alongside refining and enhancing EIOS and its output.

Keywords: CABI, horizon scanning, machine learning, pest risk management, self-organising maps.

References:

GARA (Global Agricultural Research Archive), website. Available from https://www.cabi.org/publishing-products/global-agricultural-research-archive/ [03 June 2025].

Euphresco III, website. Available from https://www.phrescoglobal.net/ [03 June 2025].

Topics of questions: relevance of an additional ranking system (SOMs) when there is already a score in the PRR: the idea is to replace the PRR score by the mapping (SOM) in the future.

Tools for horizon scanning:

Johannes Schnitzler– WHO/Medical officer– Introduction to EIOS initiative

Topic: EIOS mission and functioning

Summary: Epidemic Intelligence from Open Sources (EIOS) system is hosted by the WHO Hub for Pandemic and Epidemic Intelligence and developed in collaboration with the JRC. Additional partners have been recently included, in particular to support maintenance operations. WHO is following and supporting outbreaks and emergencies.

In order to prevent pandemics, outbreak patterns are analysed in detail (e.g.: time, location, impact, potential measures and their effects, etc). For this, agile, resilient and collaborative surveillance is needed to protect human, animal and plant health. During outbreaks, systems and experts' networks cannot be built to prevent and help against them. The strategy and vision behind collaborative surveillance is to empower countries and communities against pandemic impacts and epidemic threats. The Hub missions are to connect, innovate and strengthen capacities of countries to produce better data, analytics and decisions through different initiatives such as a pandemic simulator, an open-source program office, the International Pathogen Surveillance Network (IPSN), and the EIOS system.

The EIOS initiative aims at preventing and mitigating public health emergencies by connecting experts and data around the world in order to detect, contextualise, analyse, assess and share information. Collaboration is key within and between communities to build up capacity in public health intelligence, by sharing access to different information sources, how to use information, and how to make the best analysis out of it. Thus, the EIOS system looks for information,

extracts, classifies and summarises it, providing users the ability to query and visualise specific data. It offers tools to monitor and share this information, giving insights for potential actions to take. The system is web-based and continually evolves in line with advances in technology. It automatically scrapes information daily from more than 10,000 sources, mostly represented by media online journals, government and official sites and scientific publications, covering global information in terms of geography and languages. The retrieved information is enriched with meta-data and translations. This scraping system is based on categories, which are defined with lexical rules and contain keywords, possibly in different languages, related to specific terms or concepts (e.g. disease, natural disaster, chemical event, mass gatherings, measures taken, etc). EIOS system searches through all sources for these categories and gathers articles mentioning the keywords. A new feature is being developed to integrate radio stations (FM/AM digital and offline) as data sources in order to increase media coverage and reduce time to detect new signals.

Right now, EIOS is used by over 130 communities, including 100 Member States and other organisations. There are 250 trainings available. The V2 of EIOS is coming soon, in an effort to have more releases and iteration of the EIOS system to better adapt to the users' needs and the new technologies and in time connect to other systems. Coming next, is a new user interface, new functionalities to share information more easily (for example among communities), a recommendation system, anomalies detection, ontologies and taxonomies to link categories together to help the system to identify information patterns, and more.

The involvement of the plant health community in the system appears to be very relevant for different reasons:

- One Health programme is concerned about plant health as plant pests have an impact on human and animal health, as well as on food safety and security, which can in turn affect the displacement of people and the economy.
- The inclusion of the plant health community to EIOS provided around 3,000 new categories (with more added regularly) and thousands of additional sources, contributing substantially to the activity and curation of EOIS platform in the interest of all communities.

Keywords: collaborative surveillance, community, epidemy, impact, monitoring, threat.

References: /

Topics of questions: EIOS to screen grey literature; image analysis to identify pests or symptoms; facility to access for other communities and their connection; pre-recorded media or live streaming for the speech–to–text tool; fact checking and importance of expert opinion; model training on text tone/tonality; integration of citizen science in EIOS.

Ingrid Nezu – WHO/ EIOS Training consultant – EIOS practical session

Topic: Explanation of the EIOS system’s main functions and step-by-step practice

Summary: The EIOS system fetches and processes hundreds of thousands of articles from a wide range of sources, including traditional media outlets, social media, governments websites, blogs, expert groups and news aggregators.

The system's monitoring page is divided into two main panels:

- Navigation panel (left): to create boards and apply filters.
- Article panel (right): to display articles that match the selected filters.

Available filters in the navigation panel include:

- Time period: Can be set using a specific date range (from date A to date B) or a moving window (e.g. the last X hours/days/weeks/months).
- Categories: Each community in EIOS uses a tailored set of categories aligned with their domain. For example, the Plant health community has specific categories of plant threats classified alphabetically or by taxonomy.
- Geographic areas: Areas can be selected by continent, WHO region, or by country/territory.
- Language: Filters articles by their original language. For instance, selecting "French" will only return articles originally written in French.
- Sources: EIOS scrapes thousands of sources to capture articles. The sources can be filtered by type, language, geographic area, and more.
- Mentioned entities: Filters can be applied to show articles that mention specific persons, entities or organisations (e.g., EU, UN, WHO or Google).

When creating a new board in EIOS, users can define specific filters to tailor the content shown on the board according to their monitoring needs. They can also add a description to guide colleagues who may be using the same board, ensuring consistency and clarity in its purpose. Additionally, tags can be included to make boards easier to identify and organise. By default, new boards are created as private. To share a board with a team or a broader community, users must uncheck the "Private board" option and select the team or community who should have editing rights on the board.

Once the filters are applied, the article panel displays content that matches the defined criteria. Each article includes a range of details: the article's title, the date it was published/imported into the system, the original language, the source, and the categories assigned to it based on keyword detection. A link to the original article is provided, along with a summary automatically generated by the system.

Beyond basic filtering, EIOS offers several functionalities to support collaboration and content curation. Users can flag articles for follow-up, pin specific articles to boards (so they remain visible regardless of changes to filters), and leave comments to facilitate teamwork and discussion among colleagues. The article panel also allows further refinement by filtering articles based on their status, such as flagged, duplicated or unread.

Keywords: board, categories, EIOS, filters, media monitoring, sources.

References: EIOS User Guide; Reference Manual; EIOS self-practice exercises; Introduction to Epidemic Intelligence from Open Sources (EIOS)

Topics of questions: EIOS provides translation features for articles in languages other than English.

Paolo Tizzani –WOAH/Senior Veterinary Epidemiologist – Other communities using EIOS

Topic: Animal health community in EIOS

Summary: The World Organisation for Animal Health (WOAH) main mission is to collect information on animal diseases to avoid their international spread. This is done through international reporting: the 183 WOAH members share mandatory reports on 121 listed diseases of domestic and wild (aquatic and terrestrial) animals. These reports are sent to WOAH through the online system World Animal Health Information System (WAHIS). WOAH is also monitoring animal health threats through HS with the EIOS system and through an extended network of references centres, partners and experts. All this information received from the different channels is then verified, validated and made available to decision makers for risk assessment, to publish in official alerts and to inform risk communication.

Like plant health, animal health is currently under-represented among the EIOS communities, which are mainly focused on public health. WOAH community is made of 5 teams and 22 members. FAO, WHO and WOAH are also using EIOS to facilitate the collection of relevant zoonotic events to inform the Global Early Warning System Plus (GLEWS+) network. A dedicated community has been created for this purpose. Another community used by WOAH is gathering wildlife disease experts, with the specific purpose of monitoring health events in wildlife. The WOAH community uses around 200 categories, that gather around 120,000 signals per year. After the collection of information, they are evaluated and assessed by a group of experts and, if needed, official confirmation is asked to WOAH members before an official alert is issued. Since the beginning of WOAH activity in EIOS, on average 14% of the official alerts (immediate notifications) submitted through WAHIS have been triggered by news detected from EIOS or other HS outcomes, proving the relevance of its role within the alert system.

Thanks to the assessment of EIOS performance through a gap analysis on EIOS performance and detection capacity, WOAH has identified some areas of improvement: several countries were not covered by enough sources of relevant information (local and in the original language) and keywords of EIOS categories were not translated in all the relevant languages of the area considered.

Finally, coordination between teams and communities is key to the proper use of the system. Categories, sources, and board filters are (and must be) constantly updated to ensure system performance.

Keywords: animal health, EIOS performance, WOAH community.

References:

GLEWS+ (2013). The Joint FAO–OIE–WHO Global Early Warning System for health threats and emerging risks at the human–animal–ecosystems interface. A concept paper. Available from https://www.woah.org/fileadmin/Home/eng/Media_Center/docs/pdf/Key_Documents/04_GLEWSConcept-20-11-13_01.pdf

WOAH (website). WAHIS: World Animal Health Information System. Available from https://wahis.woah.org/#/home [03 June 2025].

Topics of questions: Frequency of news about outbreaks coming from EIOS before official channels; information from scientific journals not included in official reporting.

Vlad Dragu – JRC/position – Source Editor & Category Editor Management tools

Topic: The management tools used by EIOS web-scraping system

Summary: The Europe Media Monitor (EMM) is a platform developed and maintained by the JRC with the scope of delivering independent, relevant information about facts and opinions extracted from online media.

The EMM visits more than 20,000 sources (news sites and scientific journals) every day, gathering around 500,000 articles from various domains like sociopolitical, public health, border security and early warning innovations. A LLM extracts additional information concerning organisation, language, geographical area and more. To gather this information the EMM uses two different tools: a source editor and a category editor.

The source editor is built to manage the different sources scanned every day and intended to be accessed by users to individually shape their selections as desired. Contrary to a crawler which only follows links, this system is using a defined number of entry points (called feeds) per website, targeting the extraction of information in a more effective manner. Every source is monitored and logged to detect changes or modifications.

The category editor sorts the scraped articles from the different sources by using a work list containing keywords compiled in categories. Keywords are used to select and reject articles and can be combined with Boolean and proximity operators. A very important aspect is the multilingualism, to enable keywords to be found in several languages. The categories are tailored by users to help classifying information. The possibility to allow users to work in communities organised by domain facilitates the optimization of resources and efforts required to maintain and monitor the activity and effectiveness of specific sources and categories sustaining the web-scraping. An important advantage of having an EIOS Plant Health community is the possibility of defining and confirming collective categories and having a robust system maintenance.

Keywords: adjustment, categories, editor, EMM, keyword, network, sources.

References: JRC (website), Europe Media Monitor. Available from https://emm.newsbrief.eu/overview.html [03 June 2025].

Topics of questions: ways to structure different entities working in one network; sources and keywords in different languages; creation of private subcategories.

Luigi Spagnolo – JRC/Project Officer – Ontology modelling for public health and crisis management: the plant health use case

Topic: Ontology-based approach for plant health

Summary: The JRC is currently working on an ontology-based approach for the definition of categories and organisation in the EIOS system and beyond. In an effort to bring all crisis management capacities together and in line with the EU Preparedness Union Strategy, to achieve a cross-sectorial and holistic approach, the exchange of information and a mutual understanding among domains should be achieved. To link multiple systems, different layers of interoperability must be applied. First is the technical comparability of systems, followed by the need of legislative interoperability. Semantics embedded between these layers enable all parties to clearly understand the exchanged information. By implementing metadata, the correct interpretation of provided information from multiple sources is ensured.

To illustrate the need of interoperability to link different concepts, system and source of data, and the complexity of the exercise, an example from the plant health domain is given in Figure 1. The example focuses on a single event: the discovery of a new pest, *Seimatosporium chinense* (Yang *et al*., 2024). This can be linked to a number of different information: the source of the information (i.e.. a scientific article from the Pathogens journal), the administrative area and country affected by the new pest, pest and host taxonomy at species, genus and family level. The new pest is also linked to the concept of hazard, that can be read at the level of the symptoms, the disease, or more broadly fungal plant disease and biological hazard, which themselves are risk drivers for environmental degradation. All this information is interconnected to compose a broader and more precise picture about the pest, here illustrated by a knowledge graph. Other aspects can be considered, such as the phytosanitary options, food security and safety aspects. And all these different concepts need to be defined to form a coherent ontology for the event, in the case of this example, and for the plant health sector in a broader sense.

For the near future, the goal is to define multiple ontologies, identifying and defining concepts that are common to all domains or to a subset of domains. With the approach of conceptual modelling and by selecting relevant entities, a common ground among communities can be built. However, this is possible only by defining in univocal manner each applied concept, which is likely to represent the main challenge within the whole approach.

Keywords: communication, ontologies, taxonomy.

References: Yang H, Cheng J, Dili N, Jiang N and Ma R, 2024. *Seimatosporium chinense*, a novel pestalotioid fungus associated with yellow rose branch canker disease. Pathogens, 13(12), 1090. Available from https://doi.org/10.3390/pathogens13121090

Topics of questions: update changes in taxonomy; clarification and homogenisation of concepts (e.g.: susceptibility, priority).

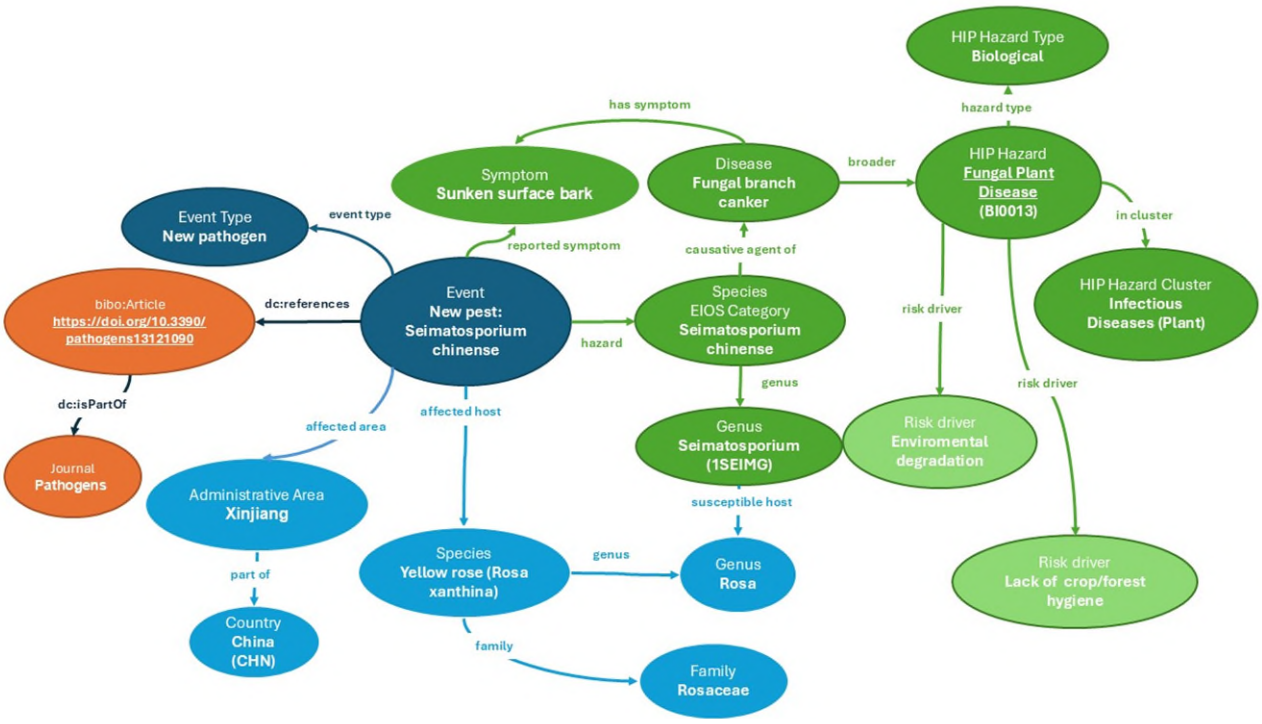

Figure 1. Example of a conceptual ontology model for an event regarding the first finding (outbreak) of the pest *Seimatosporium chinense.*

Francesca Torti – JRC/Text and Data mining Unit– International trade data analysis

Topic: Theseus - routine dissemination of statistics, pattern and anomalies detected in the trade of food

Summary: In the Digital Transformation and Data directorate of the JRC, the team of Data Science for Economic Competitiveness and Trade provides expertise in analysing international trade data, to detect potential frauds and other anomalies through the application of robust statistical tools. This activity requires the interaction with several existing databases and the development of specific tools.

The first system is TAXUD Surveillance: it enables to follow transactions at single consignment level between EU and extra-EU countries. The three main variables that are analysed, are the traded value, the traded weight and the traded units, and for each record the product is specified at a ten-digit level. The utilization of real time data allows for daily updates, although errors may be detected with delay and can alter the recordings in retrospect.

The second database is ESTAT ComExt, a service of the EC, providing official trade statistics and trade flows of the European Union. It contains both import and export and eventually also intra-EU flows. The main numerical fields are, as for the previous one, traded value, weight and units. Unlike the previous system, products are summarized to aggregates, portrayed by an eight-digit code and the publication of data can be delayed up to three months.

The third database is called UN COMTRADE from the United Nations, containing extra transactions between Australia and Canada.

The systematic analysis, performed with this data is used to estimate monthly/yearly import prices for each combination of product and origin into the EU. Furthermore, four-year price estimates for non-EU member states and analysis based on clusters as well as identification of systematic under and overpricing are provided. Prices are then compared statistically and monitored for their over- and under-pricing. As a result, structural breaks are visualized, highlighting sudden changes in trade flows.

Most of the outcomes of these analyses are published on the JRC THESEUS website.

Keywords: ComExt Intra- and Extra-EU trade data, surveillance, trade flows, UN Comtrade database.

References:

JRC, 2025. THESEUS. Available from https://theseus.jrc.ec.europa.eu/ [03 June 2025].

United Nations, 2025. UN Comtrade. Available from https://comtradeplus.un.org/ [03 June 2025].

Eurostat, 2025. ComExt Intra- and Extra-EU trade data. Available from https://ec.europa.eu/eurostat/web/international-trade-in-goods/database [03 June 2025].

Topics of questions: link specific pests to trade; nomenclature for codes.

Challenge of the workshop

As the main objective of this workshop was to obtain feedback from risk managers on EFSA's HS activity, several interactive sessions were organised throughout the workshop.

The HS outputs were presented on the first day (newsletter and dashboard) and the HS tools were proposed to participants for practicing during the second day, with simulations and guided exercises dedicated to the PeMo scoring and the EIOS platform.

On the first day, a session was organised to ask about the expectations of the participants, while on the second day, another session was dedicated to collect participants' feedback on HS tools.

On the third day, the meeting was wrapped up, adding information gathered by "ghost rapporteurs" during the event.

First session: expectations

The following icebreaking session was introduced to gather the expectations of the participants about HS for plant pests. The participants were guided through a set of questions and a summary of the answers was shared at the end of the first day.

1) Current knowledge about HS activities:

    1.1 Do you use HS outcomes other than EFSA's for your activity and if yes, what?

    The outcomes mentioned were both internal tools and open-source tools: APHIS PestLens, citizen science platforms (e.g. iNaturalist), CFIA internal tools, EIOS, EPPO report, FERA diagnostic, French epidemiological surveillance platform, ProMed, search engines for academic literature.

    1.2 What kind of information do you wish to gather from HS?

    The main topics are changes in pest distribution, interceptions in trade, eradication measures, and priorities for research and methodologies. These topics are already part of the NL. In addition, participants highlighted the need for tools, increasing probabilistic analysis (e.g.: evolution of plants species trade over time; actions taken following horizon scans: research, surveillance and regulation; pathway trends) as a further way to support decision-making.

2) Ways to improve the HS outputs:

    2.1 How frequently do you wish to be updated on HS in general?

    The most common answer was monthly (17/22), followed by the suggestion to adjust the frequency based on different needs (e.g.: priority pest more frequently, under a specific alert…).

    2.2 Which topics should be integrated to HS in PLH?

    As reflected in the 1.2 question, here again the participants indicated the importance of having information about trade flows (import and export; commodities…). It was also indicated that expanding the focus to other aspects of relevance to the epidemiology and population dynamics of the pest (e.g. host plants biology) would be desirable to

strengthen preparedness. The relevance of information on new or improved detection methods for the emerging pests was also discussed.

3) Challenges of the HS activity:

3.1 What are the downsides of HS?

Information overload caused by unfiltered or unclassified content (e.g. false positive/negative, noise or weak signals) may slower the reaction process. For this reason, a combination of automated processes, filtering and gathering of information about pests, and a final screening of the retrieved information by pest experts are all required. This still constitutes a highly resource-consuming activity for many institutions.

3.2 How confident do you feel about the results of HS?

The results of the HS are considered useful and therefore positively valued, although on certain pests the knowledge and available evidence are still so limited, that the integration of the feedback by a panel of experts is considered a crucial component to ensure confidence on the results.

Second session: practical training and HS tools feedback

To gain insights and be able to assess the main tools used by EFSA and ANSES, this session took place on the second day, after having given to participants the opportunity to test the tools. Participants were encouraged to visit three flipcharts themed i) "Communicational tools: HS newsletter and dashboard", ii) "Assessment tools: PHoRiS" and iii) "EIOS platform" where to share their specific thoughts, ideas, concerns about each topic.

Communication tools: newsletter and dashboard

The two EFSA outputs freely accessible from the EFSA website are i) the newsletter and ii) the dashboard. Both are monthly distributed, with the scope of reporting the HS findings about regulated and emerging pests in EU, targeting risk managers' needs in particular. The consensus from the majority of participants on whether they use the HS outputs and whether they are familiar with the different HS practices was, that they are familiar with the newsletter and the dashboard but rarely engage with the latter.

Newsletter
For the participants belonging to EU NPPOs, the newsletter is a well-known tool, whose main content is summarized each month during the meeting of the Standing committee of plants, animal food and feed (PAFF) of the EC. Most of participants are used to read it, although some, mainly from non-EU countries, were not aware of this publication. Follow-up feedback referred to the level of satisfaction about the product, ranking system, visibility of main issues and scope and clarity of icons.

Dashboard
The HS dashboard is still a relatively new product to many participants and not routinary used. The most consulted – and considered more intuitive – part is the third tab, i.e. the search engine allowing the retrieval of items appearing in the different newsletter searching for specific taxa and/or PeMo results. Very practical and helpful feedback was collected to be taken into account when creating new versions of the dashboard.

Assessment tools: PHoRiS and PeMo

PHoRiS is an EFSA internal tool used by experts for i) editing the newsletter content and ii) scanning new threats represented by non-regulated pests using the PeMo methodology[3] and including the results in the newsletter under preparation As the PeMo tool has the potential to be made accessible to external users in the future, an interactive session was organised in three different groups to allow participants to experience the process of ranking a pest. The pest is screened through 15 criteria belonging to five main domains: host range, entry, establishment, spread and impact, and the resulting numerical score allows the comparison of this species with other previously assessed.

During the interactive session, a discussion on the methodology was opened. Questions were raised on which pests are suitable for conducting the PeMo scored, as certain level of information is needed, and how uncertainty is covered by proxy. A discussion was raised on how to define the best results. Establishing a threshold that leads to binary assumptions (positive-negative) may result in overrating or underrating some pests. It was suggested to include the affected

[3] The PeMoScoring methodology is available at the following link

traits of the plant in the analysis, as there is a link between them and the pest impact. Also, a follow up of the positive scored pests after its ranking could complement and enrich the exercise. Finally, given the importance of anticipating threats, the implementation of this assessment tool to other factors (e.g.: abiotic phenomena) could be extended.

All feedback, on tool and methodology, was noted and will be considered during the development of the PeMo platform for external users.

EIOS platform

Following the introduction to the EIOS platform, the practical session to apprehend the tool and the experience shared from the WOAH community, the participants expressed their interest on its use to perform HS. Concerns were raised about the resources required for its regular use, questions were shared about the further evolution of the platform, i.e. integration of artificial intelligence (AI) models to reduce the noise in the article selection. The tool is searching for articles in open access sources, and the subject of grey literature was brought forward: EIOS can look for articles as long as the article title and abstract is available, but the access to the whole articles depends on the users' institutional access to the journals with subscription. Moreover, it was pointed out that EIOS is a tool used to gather information: the curation of results is responsibility of the users.

The proposal to opening the first EIOS PLH community (at that time represented by CABI and EFSA only) to all the institutions participating to the workshop was shared and well received.

Third session: Wrap up

To encourage the discussion on the third day, participants were asked to give feedback by participating in the 'seed game' and 'ghost rapporteurs' shared the observations collected during the whole duration of the workshop.

Visual feedback (seed game)

To measure the level of satisfaction on different perspectives, the participants were asked to fill tubes with different coloured seeds. The parameters measured were:

1) Overall satisfaction: level of filling;
2) Learning, technology advancement and innovation: proportion of orange colour (red lentils);
3) Networking, communication and sharing: proportion of green colour (dried green peas);
4) Engagement: proportion of white colour (rice).

Results (Fig. 2) indicate a very high level of satisfaction, given that only five over 27 were 1/5 empty. Furthermore, the second parameter (learning, technology advancement and innovation) was the most variable, likely due to the diversity of backgrounds and experience in HS activity, followed by networking and engagement.

Figure 2. Picture of seed tubes filled by the participants on the last day of the workshop.

Ghost rapporteurs

Throughout the duration of the workshop, three people were in charge of collecting information in moments of open discussion, in order to capture everything that was not reflected through the other activities. Three main topics were captured:

1) Perspectives: how future for HS is conceived?

   1.1 On conceptual developments: there is the need for specific and cross sectorial ontologies; it is important to start considering signals targeting drivers (e.g. trade, climate, migrations…) instead of specific pests.

   1.2 On technical developments: it is important to keep ensuring the evolution and further improvement of newsletter and dashboard; the integration of radio mining tools could be investigated for the plant health field too; other different sources should be taken into account (e.g: citizen science, databases, interceptions).

   1.3 On community building: questions were raised on governance, active members, accesses management, networks with similar interests, exchange platform and interactions

   1.4 On building capacity and targeted trainings on the tools: the effective capacity of individuals and institutions to engage in the use of the tools should be taken into account.

2) Concerns: which challenges or risks are associated with HS community?

   2.1 Would there be a real motivation to share information between states (e.g.: new notifications/interceptions)?

   2.2 How can information about pests be tracked on EIOS platform?

   2.3 How to integrate grey literature?

   2.4 Is joining the HS community equally accessible to all institutions and participants?

3) Interactions: how participants engaged and collaborated during the workshop?

   3.1 Good ice-breaking: interactions took place on the basis on various level of reciprocal knowledge among participants, but quickly extended to everyone from the very beginning.

   3.2 The high interest on other presentations led to many questions and interactions.

   3.3 Active contribution to practical exercises, illustrating the quantity and quality of the interactions.

   3.4 Different layers of interactions allowed the richness and complexity of specific needs and interests to be highlighted, e.g. between NPPOs and Risk assessors, or across different countries/continents.

Conclusions and recommendations

The workshop closed with a number of final remarks and take-home messages summarised here below.

- Diversity of approaches and tools.

The experience shared by the participants showed the richness of alternatives and differences in needs and constraints that each institution faces in this type of activity. The first step towards effective communication and action targeted to emerging pests would be therefore for a common understanding and identification of global needs in HS. The experience and activity long performed by the JRC, ANSES and EFSA together could be better shared with the different actors: EIOS provides in this sense a promising tool, where advanced users (EFSA, CABI, ANSES) and technical support (JRC, WHO) are promptly available to new members.

- Review of PeMo tool.

PeMo is a tool initially conceived for EFSA risk assessors use: the monthly delivered results are prone to the setting and categories defined long time ago. Most of the participants expressed their interest in the evolution and opening up of such an engine. This suggests the need for EFSA experts to review the methodology and revamp the platform, in order to make it accessible to external users, which would probably require a more user-friendly interface and a more adaptable approach. Such a resource consuming process would foresee the involvement of risk managers, in order to ensure that the new version of PeMo is still shaped to their needs as it is today, or even better suited.

- Opening up of the EIOS Plant Health community.

Within the EIOS Plant Health community, new members could get targeted training and support, to set and use the tool to their specific needs, and actively participate to the community activities. This would allow the Plant Health community to increase its screening capacity, accelerate information sharing and better integrate with other existing communities, in line with One Health approach. Furthermore, new features can be assessed and validated, such as the application of AI techniques (e.g. to reduce noise, to identify trends, etc) or integration of trade data, while enriching the (irreplaceable) human component with engaged community members.

Candidate members can contact eios@who.int (CC plants@efsa.europa.eu), indicating the interest in joining EIOS Plant Health Community.

Once credentials are provided, the new members will be trained on community rules and participate to regular meetings, while the generic training material on the platform and webinars from other communities are freely accessible. Community administrators are available for setting up the specific boards and providing specific instructions upon request.

- Better integration of risk managers in HS activity.

The urgency of better integrating the view of risk managers within the HS context was identified. Strengths and shortcomings of this type of activity should be equally understood by both risk assessors and risk managers, in order to i) optimise resources and prioritize tasks of risk assessors, ii) lighten and therefore accelerate the HS process. As evidenced by all the speakers at the workshop, the HS activity requires a dynamic approach: methods, tools, technologies are in continuous evolution, and information and data are shared increasingly quickly. Only by keeping a dialogue and interconnection among all actors and opening to other existing realities, it will be possible to maintain a satisfactory level of analysis, able to foster preparedness and timely reaction towards emerging threats.

Overall, the workshop was enriching the future improvement of HS tools and the shaping of the next steps. On the long term, the relevance of a community is ensured by the regular discussion among members, provision of webinars, guest talks by experts, collaboration on projects or research that address common challenges and different areas of interest.

Abbreviations

Africa CDC	Africa Centres for Disease Control and prevention
AI	Artificial Intelligence
AMR	Antimicrobial Resistance
ANSES	French Agency for Food, Environmental and Occupational Health & Safety
APHIS	Animal and Plant Health Inspection Service
ASEAN	Association of Southeast Asian Nations
CABI	CAB International
CBR	Changing Biosecurity Risk
CFIA	Canadian Food Inspection Agency
EC	European Commission
EFSA	European Food Safety Authority
EIOS	Epidemic Intelligence from Open Sources
EMM	Europe Media Monitor
EPPO	European and Mediterranean Plant Protection Organization
EU	European Union
DAFF	Department of Agriculture, Fisheries and Forestry
FAO	Food and Agriculture Organization
GARA	Global Agricultural Research Archive
GBIF	Global Biodiversity Information Facility
GLEWS+	Global Early Warning System Plus
HPP	High Priority Pests
IPSN	International Pathogen Surveillance Network
HS	Horizon Scanning
IPPC	International Plant Protection Convention
JRC	Joint Research Centre
LLM	Large Language Model
NPPO	National Plant Protection Organism
NPPP	National Priority Plant Pest list
PAFF	Standing committee of plants, animal food and feed
PCE	Phytosanitary Capacity Evaluation
PLH	Plant Health
POARS	Pest Outbreak Alert and Response Systems
PRiM	Pest Risk Monitoring
PRR	Pest Risk Registers
RPPO	Regional Plant Protection Organism
SOM	Self-Organising Map
USDA	United States Department of Agriculture
WAHIS	World Animal Health Information System
WHO	World Health Organization
WOAH	World Organisation for Animal Health

Appendix A – List of participants

Name	Surname	Affiliation	Role
Aino-Maija	Alanko	Finland's NPPO	Participant
Duncan	Allen	UK's NPPO (Defra)	Participant
Caroline	Bellenot	French Agency for Food, Environmental and Occupational Health & Safety (ANSES)	Organiser
Camilo	Beltran Montoya	International Plant Protection Convention (IPPC) Secretariat	Speaker
Kristien	Braeken	Belgium's NPPO	Participant
James	Cullum	CAB International (CABI)	Speaker
Orazio	Corbo	Italy's NPPO	Participant
Arūnas	Dereškevičius	Lithuania's NPPO	Participant
Vlad	Dragu	European Commission (EC) – Joint Research Centre (JRC)	Remote speaker
John	Eivers	Ireland's NPPO	Participant
Pauline	Farigoule	France's NPPO	Participant
Manuel	Fenech	Malta's NPPO	Participant
Emmanuel	Gachet	ANSES	Organiser
Baldissera	Giovani	EUPHRESCO	Participant
Ingrid	Hammermeister Nezu	World Health Organization (WHO)	Remote speaker
Yahya	Kandeh	Africa Centres for Disease Control and Prevention (Africa CDC)	Speaker
Mart	Kinkar	Estonia's NPPO	Participant
Rumyana	Krusteva	Bulgaria's NPPO	Participant
Nicolas	Leveque	EC – DG SANTE	Speaker
Júlia	Lopez Mercadal	Agroscope	Organiser
Dinka	Matošević	Croatia's NPPO	Participant
Maria Teresa	Messias Afonso	Portugal's NPPO	Participant
MaryLucy	Oronje	CABI	Speaker
Josh	Persi	Canada's NPPO (CFIA)	Speaker
Nina	Pezdirec	Slovenia's NPPO	Participant
Ernst	Pfeilstetter	Germany's NPPO	Participant
Dorothea	Pöchlauer	European Food Safety Authority (EFSA)	Organiser
Brendon	Reading	Australia's NPPO (Department of Agriculture, Fisheries and Forestry)	Speaker
Philippe	Reignault	ANSES	Speaker
María	Ribaya Munoz	EFSA	Organiser
Godshen	Robert	United States of America's NPPO (USDA APHIS)	Speaker
Sandra	Savarese	Argentina's NPPO (SENASA)	Participant

Johannes	Schnitzler	WHO	Remote speaker
Luigi	Spagnolo	EC – JRC	Remote speaker
Muriel	Suffert	European and Mediterranean Plant Protection Organization (EPPO)	Participant
Paolo	Tizzani	World Organisation for Animal Health (WOAH)	Speaker
Francesca	Torti	EC – JRC	Remote speakers
Sara	Tramontini	EFSA	Organiser
Adamo	Uboldi	EC – JRC	Chairman
Marja	van der Straten	Netherlands' NPPO	Participant
Sybren	Vos	EFSA	Organiser
Samuel	Warner	EPPO	Participant
Elsa	Wert Castro	Spain's NPPO	Participant

Appendix B – Agenda of the event

DAY 1 – TUESDAY 11TH FEBRUARY		
FORESIGHT AND PREPAREDNESS		
14:00 - 14:15 CEST	Welcoming speech	Philippe Reignault (ANSES)
14:15 - 14:35	Horizon scanning – background and use	Nicolas Lévêque (European Commission)
14:35 - 15:00	Horizon Scanning activity on Plant Health in EFSA	EFSA/ANSES
15:00 - 16:00	Icebreaking discussion	
	Coffee break	
16:30 - 17:00	IPPC activities: Pest Outbreak, Alert Response System and Horizon scanning	Camilo Beltran Montoya (IPPC)
17:00 - 17:45	Introduction to EIOS	Johannes Schnitzler (WHO)
17:45 - 18:00	Wrap up	
18:00 - 19:30	***Welcome cocktail in ANSES premises***	

DAY 2 – WEDNESDAY 12TH FEBRUARY		
DETECTION OF PLANT HEALTH THREATS		
9:00 - 9:20	EIOS presentation	WHO representatives
9:20 - 10:45	Practical session on EIOS	Ingrid HAMMERMEISTER NEZU
	Coffee break	
11:00 - 11:30	Other communities using EIOS	Paolo Tizzani (WOAH)
11:30 - 12:10	Source and category editors	Vlad Dragu (JRC)
12:10- 12:40	Ontology for the future	Luigi Spagnolo (JRC)
	Lunch break	
14:00 - 14:45	Practical session on PeMo	EFSA/ANSES
14:45 - 16:15	Presentations from outside EU	Yahya Kandeh (Africa CDC) Brendon Reading (DAFF)
	Coffee break	
16:30 - 18:00	Open table and Wrap up	
	Social dinner at restaurant	

DAY 3 – THURSDAY 13TH FEBRUARY		
FUTURE INSIGHTS		
9:00 - 10:30	Presentations from outside EU	MaryLucy Oronje (CABI) Josh Persi (CFIA) Godshen Robert (NCSU)
	Coffee break	
11:00 - 11:45	Theseus: routine dissemination of statistics, patterns and anomalies detected/estimated in the trade of food	Francesca Torti (JRC) Domenico Perrotta (JRC)
12:00 - 13:00	Wrap up and conclusions	
13:00	***Closing of the event***	