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D8.5 Proceedings of the SPRINT Final Conference

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Acronyms

ADI	Acceptable Daily Intake
AMPA	Aminomethylphosphonic acid
BGV	Biological Guidance Value
BGL	Biological Guidance Limits
CAP	Common Agricultural Policy
DG Agri	Directorate-General for Agriculture and Rural Development
EFSA	European and Food Safety Agency
EU	European Union
FADN	Farm Accountancy Data Network
FAO	Food and Agriculture Organization of the United Nations
GAEC	Good Agricultural and Environmental Conditions
HBM	Human Biomonitoring
INSERM	National Institute of Health and Medical Research
IPM	Integrated Pest Management
NGO	Non-Government Organisation
OECD	Organisation for Economic Co-operation and Development
PBK	Physiologically-based biokinetic
PPI	Pesticide Prioritisation Indicator
PPP	Plant Protection Products (Sprint results refer broadly to pesticides (including biocides and veterinary products), not just PPPs
R&I	Research and Innovation
SUD	Sustainable Use of Pesticides Directive

1 Introduction

The SPRINT final conference, Shaping the Future of Sustainable Plant Protection, took place on 25th June 2025 in Brussels. The overall aim of the conference was to present the results of the 5-year project to a broad range of stakeholders. It sought to bring together key stakeholders from European Parliament, European Commission, farmers' unions, farmers, advisory services, NGOs, as well as the SPRINT researchers and researchers from other projects to discuss the project results. A particular focus was on engaging with policy-makers, hence locating the event in Brussels.

The final conference was organised in two parts:

The morning session highlighted the key messages from the project's environmental and human health findings, and focused on:

- Evidence of the environmental impacts of pesticide - exposure and risk
- Evidence of the human health impacts of pesticide - exposure and risk
- In light of the project findings, recommendations for pesticide regulations and policy

The afternoon session focused on supporting the transition to a reduced use of pesticides, with a focus on:

- Tools that can be used to support policy-making
- Findings on the costs and benefits of pesticide use
- Evidence from initiatives that have successfully transitioned to reduced pesticide use
- Recommendations for developing transition pathways towards more sustainable plant production

The event was widely promoted through SPRINT's website and social media channels resulting in 430 registrations. Around 260 participants from over 40 countries participated in the conference on the day. Around 70 of these attended the conference in-person and 190 were online.

A magazine summarising the results of the project was provided in the delegate packs and is available here: https://sprint-h2020.eu/index.php/news/sprint-magazine. The conference also benefited from live social media posts on the day.

The full agenda for the day is found in Appendix A1. Furthermore, full details of the conference, including presentations and videos from the day are available on a dedicated page on the project website: https://sprint-h2020.eu/index.php/news/stakeholder-resources/249-shaping-the-future-of-sustainable-plant-protection

The full recording of the event is on SPRINT's YouTube channel (with currently over 250 views) to allow wider and repeated access to the presentations:

https://www.youtube.com/watch?v=XRA-mnclTvw

https://sprint-h2020.eu/index.php/news/stakeholder-resources/249-shaping-the-future-of-sustainable-plant-protection

2 Summary of presentations

2.1 Morning sessions

2.1.1 Introductory remarks - Why this research is important

The session was opened with a welcome by the conference facilitator, Matt Reed, from University of Gloucestershire, followed by a premiere screening of the new SPRINT animated video, which highlights key results from the project (https://www.youtube.com/watch?v=Mrm8yDqk9v0)

Why research and innovation are key to the future of sustainable plant protection | Gisela Quaglia, DG AGRI, European Commission

Gisela Quaglia from DG AGRI, European Commission, opened the conference. Her speech explored why research and innovation are essential to shaping the future of sustainable plant protection – at a time when European agriculture faces unprecedented challenges including climate change, evolving pest pressures and biodiversity loss. She summarised key EU initiatives designed to support sustainable methods of pest management for farmers, including the EU's research programmes Horizon 2020 and Horizon Europe. Under Horizon Europe, nearly 9 billion euros has been allocated to R&I in agriculture, food and economy – including for projects that target plant health and crop protection. She highlighted the growing role of agroecology as a key instrument in reducing the use of pesticides in agriculture. The Agroecology Partnership, funded by Horizon Europe and launched in 2024, aims to underpin Europe's agroecological transition. She further described the Common Agriculture Policy as means of ensuring that innovations reach farmers quickly and effectively, whilst also enabling the wider uptake of farmer-led innovations.

Why SPRINT matters?— EFSA considerations | Yann Devos, EFSA

Yann Devos's presentation summarised EFSA's perspective on the importance of the SPRINT project in shaping sustainable plant protection. Yann highlighted EFSA's role in providing independent, science-based advice to protect human, animal, plant, and environmental health, especially as risk assessments evolve to meet the challenges of a fast-changing world. The SPRINT project was praised for aligning with the One Health agenda, promoting integrated approaches to pesticide risk assessment by accounting for real-life exposure, mixture toxicity, and cumulative risks. Yann also valued SPRINT's contributions to developing practical tools and data for regulatory science and bridging

the gap between academic research and regulatory needs. The agency encourages collaboration between researchers and risk regulators, calling for more strategic, platform-based partnerships. EFSA also discusses opportunities and challenges in connecting prospective (predictive) and retrospective (observational) risk assessments, advocating for better data practices and monitoring to support regulatory uptake and effective risk mitigation.

Pesticides and health state of the art - Overview | Isabelle Baldi, University of Bordeaux

Isabelle Baldi's presentation provided a comprehensive overview of the current state of knowledge on the health impacts of pesticide exposure. Drawing on findings from INSERM's collective expert reports (2013 and 2021), she highlighted the use of multiple scientific disciplines, ranging from analytical chemistry and toxicology to epidemiology and social sciences, to assess pesticide-related risks across molecular to population levels. The evidence points to strong or intermediate associations between pesticide exposure and various chronic diseases, including certain cancers (e.g. non-Hodgkin lymphoma, prostate cancer), neurological disorders (e.g. Parkinson's, Alzheimer's, cognitive decline), respiratory conditions, and developmental outcomes in children. However, she stressed significant knowledge gaps remain—particularly regarding European exposure patterns, specific pesticide molecules, and the health effects of chemical mixtures. Isabelle called for more interdisciplinary research to address these gaps and ensure public health decisions are grounded in robust, region-specific evidence.

SPRINT project overview | Violette Geissen, Wageningen University & Research

Violette Geissen's presentation outlined the overarching aims and progress of the SPRINT project, which seeks to assess and mitigate the global health risks of pesticide use while supporting the transition to sustainable agriculture. SPRINT addresses critical challenges such as real-world exposure to pesticide mixtures, environmental contamination, and human health risks by collecting extensive field data across 10 European countries and Argentina, covering both Integrated Pest Management (IPM) and organic systems. The project is developing a Global Health Risk Assessment Toolbox that integrates ecological and human toxicity data, exposure modelling, and risk indicators. Field campaigns have revealed widespread pesticide residues in soils, crops, air, water, and indoor dust, even in organic systems. These findings which can inform policy recommendations, regulatory frameworks, and transition pathways, were all guided by a multi-actor stakeholder network spanning governance to consumers.

Pesticide regulatory context | Lindsey Hendricks-Franco, Ecologic Institute

Lindsey Hendricks-Franco's presentation focused on the regulatory policy landscape for pesticides in the EU, highlighting the complexity and fragmentation of current frameworks. She outlined the two key phases of regulation: pre-market risk assessment, which involves the approval of active substances and authorisation of plant protection products based on environmental and human health risk assessments; and post-market

surveillance, which includes monitoring and targeted risk reduction. Lindsey pointed out regulatory gaps, such as the lack of standards for pesticide residues in air, soil, and indoor dust, and the absence of human biological limit values. Drawing on SPRINT findings, she emphasised the need for more realistic, data-driven methodologies in pre-market assessments, improved environmental and human biomonitoring, and tools for prioritising risks and scaling exposure assessments. She also addressed policy implications for enabling a transition away from pesticide reliance, including barriers to farmer adoption and the role of CAP reform.

2.1.2 SPRINT Results: Environmental impacts (pesticide exposure, risk assessment and policy recommendations)

Environmental impacts - distribution of pesticide residues and health status | Abdallah Alaoui, University of Bern

Abdallah Alaoui's presentation outlined the environmental and health impacts of pesticide use, based on a comprehensive assessment of pesticide distribution across ecosystems, animals, and humans. The study analysed over 200 pesticide residues across 4600 soil, water, air, crops, and biological samples. It found widespread contamination, including by hazardous and dual-use substances (i.e. used as both plant protection products and biocides). Of particular concern was the high number of pesticides found in indoor dust. Overall, high concentrations of substances like glyphosate, AMPA, chlorpyrifos, and tebuconazole in both conventional and organic systems were identified. A pesticide prioritisation indicator (PPI) was developed to rank substances by health concern. The study revealed that farmers, neighbours and consumers are chronically exposed to mixtures of pesticides, underscoring the need to consider internal exposure, especially via adipose tissue, for future risk assessments. Abdallah recommended biomonitoring and detailed surveys to close knowledge gaps, and highlighted the importance of policy tools for prioritisation, monitoring, and supporting a transition to safer alternatives.

Ecotoxicological assessment | Nelson Abrantes, CESAM - University of Aveiro & Paula da Silva Tourinho, Masaryk University

Nelson Abrantes and Paula Tourinho's presentation detailed the ecotoxicological assessment of pesticide mixtures on terrestrial and aquatic ecosystems across 11 case study sites. The study tested mixtures of five commonly detected pesticides at five concentration levels, including real-world exposure scenarios. Using a combination of standard OECD tests and novel bioindicators, significant negative effects were observed on soil organisms such as springtails and earthworms, even at concentrations deemed "safe" under current regulatory thresholds. Some highlights include: i) soil microbes exhibited delayed functional and structural changes, detectable only after prolonged exposure (56+ days), suggesting late-onset impacts, and that ii) native species were often more sensitive than standard test organisms and highlighted synergistic effects of pesticide mixtures. Findings advocate for extending testing durations and incorporating

non-standard endpoints to improve ecological risk assessment, especially under realistic exposure conditions.

2.1.3 Q & A Session

Abdallah Alaoui, Nelson Abrantes and Paula Torinho, together with other SPRINT researchers in the audience, responded to participants' questions on their methodologies for testing mixtures of pesticides. They discussed the challenges of differentiating the effects of individual substances within a mixture from the combined mixture effects. They further considered the contrasting effects of pesticides on males and females - both humans and animals – before discussing whether additives (the non-active ingredients) in commercial formulas can increase the toxicity of pesticides.

The discussion board was very active for online participants. 36 questions were posed in total to SPRINT (see Appendix A2). SPRINT researchers were able to respond to nearly all questions with some follow-ups via email.

Recommendations for Pre- and Post-Market Policy - Part 1 | Lindsey Hendricks-Franco, Ecologic Institute

In her second presentation, Lindsey Hendricks-Franco outlined targeted policy recommendations to strengthen both pre- and post-market pesticide regulation in the EU. She highlighted gaps in current risk assessment processes, particularly the lack of consideration for real-world pesticide mixtures. Recommendations include expanding pre-market ecotoxicological testing to incorporate native species, and sensitive ecosystem functions; revising environmental fate assessments to account for background contamination and indoor degradation; and integrating connectivity between farm use and broader environmental compartments. Post-market surveillance should adopt legally binding, risk-based thresholds for pesticide residues in soil, air, water, and indoor dust, and introduce total mixture limits. She also advocated for accounting for the monitoring and hazard-based prioritisation indexes into the taskforces around the forthcoming EU Soil Monitoring Law, integrating pesticides into soil health definitions, and adopting stronger regional remediation policies to address high contamination levels.

2.1.4 SPRINT Results: Human health impacts (pesticide exposure, risk assessment and policy recommendations)

Human Biomonitoring results and interpretation | Paul Scheepers, Radboud University

4Paul Scheepers and colleagues presented human biomonitoring results from the SPRINT project, which assessed pesticide exposure among farmers, neighbours, and consumers across 10 European countries. Samples of blood, urine, and faeces were analysed for up to 209 pesticide residues. The study found that most participants had detectable levels of

multiple pesticide residues—urine samples showed the highest median number of compounds (7 per sample), followed by faeces and blood. Physiologically-based biokinetic (PBK) modelling validated exposure estimates, confirming that uptake levels for several pesticides (e.g. acetamiprid, glyphosate, tebuconazole) were generally below than respective acceptable daily intake (ADI) or biological guidance values (BGVs), although some countries exceeded thresholds for specific compounds like 2,4-D. Mixture risk assessments identified potential concerns at high exposure percentiles. The study's cross-sectional design limits interpretation of long-term trends, but its extensive dataset lays the groundwork for future risk assessments, epidemiological research, and the development of tailored guidance values, especially for vulnerable populations.

Exposure assessment in SPRINT: An overview | Daniel Figueiredo, Utrecht University

Daniel Martins Figueiredo's presentation provided an in-depth overview of the exposure assessment methodologies used to evaluate human pesticide exposure through dietary and non-dietary routes. The modelling framework incorporated simulations at both individual and population levels, accounting for variables such as age, body weight, and exposure behaviour. Routes of exposure included inhalation, dust ingestion, dermal contact, and dietary intake, with assumptions applied to account for data gaps. Real-world exposure was further assessed using silicone wristbands, worn by 641 participants across 10 European countries, detecting 173 pesticide compounds, highlighting prevalent environmental mixtures such as permethrin, chlorpyrifos, and fipronil. Duplicate Portion Analysis (DPA) captured actual dietary intake over 24-hour periods, revealing high detection rates for substances like metalaxyl-M and piperonyl butoxide. Aggregated and cumulative risk modelling showed that realistic worst-case scenarios (e.g. high exposure from diet and environment) may pose serious health risks, particularly when assuming equal potency among pesticide compounds. The results underscore the importance of refining models and integrating real-world data to better inform regulatory frameworks and public health protection.

Human Toxicology Studies | Daniele Mandrioli, Cesare Maltoni Cancer Research Center, Ramazzini Institute

Daniele Mandrioli's presentation detailed the human toxicology work, which employed a three-tiered EFSA-guided component-based approach to evaluate the health effects of pesticide mixtures. In Tier 1, the team identified the top 20 most concerning pesticides using *in silico* modelling and occurrence data, prioritised via weighted hazard quotients. Tier 2 involved *in vitro* testing of the top 10 substances using standard cytotoxicity and genotoxicity assays alongside innovative models such as kidney cell lines and organoids. Results showed clear dose-dependent toxic effects, including cellular damage and gene expression changes. Tier 3 tested the top 3 substances and their mixtures *in vivo* using rat models, revealing significant endocrine disruption, liver and kidney toxicity, microbiome changes, and altered sexual maturation—even at doses considered safe under current regulatory standards. The new "SPRINT indicators" proved to be sensitive

tools, particularly for mixture effects, and the findings support their future use in risk assessment and pre-market testing. Overall, the results validate a component-based, mechanistic approach to assessing real-world pesticide exposure risks.

Pesticide exposure and the Microbiota-Gut-Brain Axis | Eoin Gunnigle, University College Cork

Eoin Gunnigle and John Cryan's presentation explored how pesticide exposure can disrupt the microbiota-gut-brain axis, even at doses below established toxicological thresholds. Integrating gut microbiota into SPRINT's Tier 3 indicators and global health risk assessment toolbox, their research demonstrated that exposure to glyphosate and pesticide mixtures alters gut microbial composition—specifically reducing beneficial groups like *Lactobacillaceae*—and impairs social behaviour in mice. Behavioural disruptions were shown to be transferable through faecal microbiota transplantation, suggesting a causal link between pesticide-altered gut microbiota and neurobehavioural outcomes. A 13-week rat study revealed that mixtures of high-priority pesticides had a greater and dose-dependent impact on microbial diversity and neuroactive metabolic pathways ("gut-brain modules") than individual substances. The findings underline the need to include microbiome effects in long-term pesticide risk assessments and call for human cohort studies to investigate the broader public health implications of pesticide-induced microbiota changes.

Recommendations for Pre- and Post-Market Policy - Part 2 | Lindsey Hendricks-Franco, Ecologic Institute

In her third presentation, Lindsey Hendricks-Franco expanded on policy recommendations for improving pesticide regulation by focusing on human health protection. Based on the SPRINT publications and deliverables, she called for stronger pre-market toxicological testing, including assessments of neurotoxicity, microbiome effects, and impacts on vulnerable populations and early life stages. Recommendations included improving non-dietary exposure assessments, increasing safety factors for exposure thresholds, and developing Biological Guidance Values (BGVs) to enable meaningful human biomonitoring. She urged the integration of aggregate and cumulative exposure—both dietary and environmental—into risk assessments for all population groups, not just occupationally exposed individuals. Additionally, Lindsey advocated for harmonised EU-wide biomonitoring programmes and legally binding Biological Limit Values (BLVs) to support cross-agency consistency. The presentation concluded by promoting the use of the SPRINT toolbox to identify high-risk pesticide-crop combinations, enabling targeted risk reduction and supporting more responsive and protective regulatory strategies.

2.1.5 Panel Discussion

Morning Panel Discussion | Moderator- Lindsey Hendricks-Franco, Ecologic Institute). Panellists: Maria Anastassiadou, EFSA; Jacob van Klaveren, RIVM (National Institute for Public Health and the Environment); Paul Scheepers, Radboud University; Daniele

Mandrioli, Cesare Maltoni Cancer Research Center, Ramazzini Institute; Daniel Figueiredo, Utrecht University; Nelson Abrantes, CESAM, University of Aveiro

SPRINT researchers and regulatory experts convened to discuss the most significant gaps in the scientific understanding of pesticides' risks to human health and the environment, as well as the opportunities to strengthen links between research and pesticide risk assessments. Key knowledge gaps raised by the panellists included the effects of pesticides on the human brain, and potential neurotoxic outcomes, such as Parkinson's disease. A number of issues relating to exposure were discussed, including the effects of pesticide exposure at different stages in the human lifecycle, with particular concerns surrounding exposure during childhood (including pre-birth, *in utero*) and the limitations of current models for capturing these effects. Another area that needs further exploration is the accumulative effects of multiple exposures that occur at different points in time. Discussing knowledge gaps with ecological implications, more research is needed to understand the environmental fate of pesticides – not just their active ingredients, but also their metabolites. To support policy, it was suggested we need stronger means to integrate data from human and animal studies and into risk assessments, and to understand the risks of combined exposures to not just pesticides but other toxins. Finally, the panel discussed when it is appropriate for authorities to apply the precautionary principle, and restrict pesticides despite gaps in scientific knowledge.

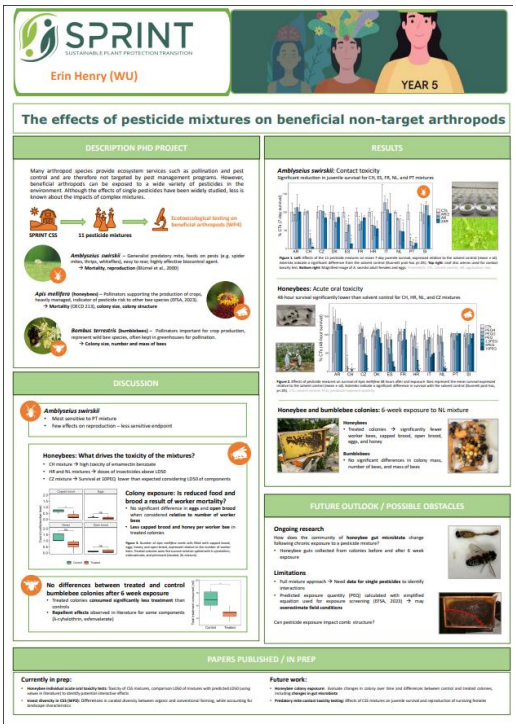
2.1.6 Lunchtime Poster Session

Seven posters presenting diverse aspects of SPRINT's research were on show at the event (see https://sprint-h2020.eu/index.php/resources/sprint-summaries/research-posters):

- Development of a physiologically-based model for the insecticide acetamiprid and its metabolite by Franziska Ditterich, Paula da Silva Tourinho, Christian Poll, Jakub Hofmann and Ellen Kandeler
- The effects of pesticide mixtures on beneficial non-target arthropods by Erin Henry
- How does exposure to pesticide residues impact gut health? By Maaike Gerritse, Jos Boekhorst, Bart van der Hee and Jerry Wells
- Novel soil microbial indicators - tested in a microcosm experiment with the CSS pesticide mixtures by Franziska Ditterich, Paula da Silva Tourinho , Christian Poll , Jakub Hofmann and Ellen Kandeler
- Effects of MCPA and difenoconazole on glyphosate degradation and soil microorganisms by Philipp Mäder, Fabian Stache, Lisa Engelbart, Carolin Huhn, Zuzana Hochmanová, Jakub Hofman, Christian Poll and Ellen Kandeler
- Functional gene analysis - A new method for pesticide approval? by Fabian Stache, Franziska Ditterich, Zuzana Hochmanová, Jakub Hofman, Christian Poll and Ellen Kandeler
- The Gender+ dimension in SPRINT by Margreet van der Burg, Antonia Riedel, Ana Frelih-Larsen, Matthew Reed, Jane Mills, Abdallah Alaoui, Christine Bigler and Vera Silva

All posters were entered into a competition. All were excellent entrants, but judges crowned "The effects of pesticide mixtures on beneficial non-target arthropods" by Erin

Henry from Wageningen University the winner for its clear presentation and explanation of the research.



2.2 Afternoon sessions

2.2.1 The SPRINT Toolbox

The SPRINT Toolbox | Jakub Hofman, RECETOX, Masaryk University

Jakub Hofman's presentation introduced the Global Health Risk Assessment Toolbox developed by SPRINT, to be launched early 2026, just before end of the SPRINT project. This integrated, publicly accessible platform compiles pesticide data from SPRINT case studies, literature, and modelling to assess exposure and health/environmental risks of pesticide mixtures at local, national, and EU levels. The toolbox features tools for estimating emissions, modelling environmental concentrations in soil, air, water, food, and feed, and assessing risks to humans, animals, and ecosystems. It will support policymaking by identifying priority areas for intervention and enabling mitigation strategies. Toolbox applications extend to other stakeholders: for instance the ecological risk map (created for the prioritized active substances in the Czech Republic, Denmark, and the Netherlands, covering both terrestrial and aquatic environments) can provide a clear and accessible way to show to the general public where ecosystems may be under threat, helping raise awareness and support for environmental protection. Specific modules address dietary exposure, farm-animal feed intake, and air concentrations using probabilistic models.

2.2.2 Pesticide cost-benefit analysis

Pesticide cost-benefit analysis | Claudia Meier & Adrian Müller, Research Institute of Organic Agriculture (FiBL), Farshad Soheilifard, Technical University of Denmark This presentation by Claudia Meier, Adrian Müller, Farshad Soheilifard, and colleagues focused on the cost-benefit analysis of pesticide use and reduction strategies in agriculture. Drawing on data from multiple case study sites, the team evaluated both farmer and external (societal) costs associated with current crop protection practices. The analysis revealed considerable variation in application rates among pesticides and locations and highlighted the economic burden of pesticide use, particularly for perennial crops. Private costs and farm-level income assessments using FADN data showed that reduced pesticide use can lower input costs and sometimes increase gross income, though impacts vary by crop type. Intervention strategies such as agroecological practices and organic farming demonstrated potential to reduce societal costs related to human health, ecosystems, and resource use, but often led to reduced yields. These outcomes could be mitigated through complementary measures like food waste reduction and dietary shifts. The team concluded that pesticide reduction is economically viable when external costs are internalised and farmers are supported with risk management tools, advisory services, subsidies, and whole-food system approaches. Key policy recommendations include better data-sharing, EU-wide monitoring, and stronger enforcement and knowledge-exchange mechanisms.

2.2.3 Q&A

Responding to an audience question, Farshad Soheilifard acknowledged that the study only considered the societal costs of pesticides and not their benefits. He explained the research acts as "a warning" and does not represent "the final conclusion".

2.2.4 Success Stories

Hay production farming and Zavod Seneno–Slovenian Hay initiative| Peter Apat, Slovenia

Peter Apat's presentation recounted the transformation of his Slovenian dairy farm from conventional silage-based production to a sustainable, pesticide-free hay-based model. Motivated by land scarcity, product value addition, and demand for hay milk, the farm invested in renewable infrastructure—such as a biomass furnace and solar panels—to support CO_2-neutral hay drying. The transition, completed in 2019, resulted in reduced fertiliser and grain use, elimination of pesticides, and improved animal welfare. Economic outcomes were positive, with higher product prices (+50% on-farm) and enhanced customer interest, especially for dairy and meat products. Peter also presented the success of the Zavod Seneno Slovenian Hay Initiative, which grew from 42 to 879 farms between 2022 and 2024 and introduced EU-recognised specifications for hay milk and hay-fed meat. He urged EU policymakers to acknowledge the diversity of farmers, support small local farms, and enable them to continue delivering quality, sustainable food systems.

Biological control in peppers - Spain | Francisco Torró - SURINVER Group, Spain

Francisco Torró's presentation highlighted the long-term success of biological pest control in pepper production in Cartagena, Spain. Initially faced with an unsustainable phytosanitary situation in the 1990s—marked by ineffective chemical treatments and virus outbreaks such as Tomato Spotted Wilt Virus—local farmers shifted toward biological solutions, including the use of natural predators like *Orius* and *Amblyseius* species. Despite early setbacks due to chemical residues and compatibility issues, biological control expanded rapidly and now covers 100% of the growing area managed by Surinver. Challenges included managing secondary pests (whiteflies, aphids, mites), emergent pests (stink bugs, scale insects), and the need for extensive farmer training. The project also emphasised the promotion of biodiversity both inside and around greenhouses through habitat enhancement and native vegetation. Results include pesticide reduction, improved pest control, economic gains, and ecosystem benefits such as erosion control and landscape enhancement. Present-day challenges involve expanding biological control to new pests, maintaining preventive measures, and adapting to climate change and emerging threats like *Trips parvispinus.*

2.2.5 Biological control in the EU

Biological control in the EU | Domenico Deseiro, DG SANTE, European Commission

Domenico Deserio's presentation focused on the EU regulatory framework for biological control products under Regulation (EC) 1107/2009. He outlined the two-tier process involving EU-level approval of active substances and national-level authorisation of plant protection products , emphasising increasing applications and approvals for biopesticides, especially micro-organisms, plant extracts, and pheromones. Efforts to facilitate market access for these biocontrol agents include new guidance documents, simplified data requirements, and harmonised test methods, particularly for emerging substances like iRNA, peptides, and bacteriophages. He highlighted the regulatory and risk assessment challenges associated with microbial consortia and novel biocontrol technologies, noting ongoing revisions and stakeholder consultations. In 2025, the European Commission plans to introduce a legislative simplification package with fast-track procedures for biopesticide approval and strengthened resources for EFSA to accelerate risk assessments while maintaining high consumer and environmental safety standards. The proposals aim to clarify definitions, allow provisional authorisations, and streamline access to sustainable plant protection products across the EU.

2.2.6 Transitional pathways policy recommendations

Transition pathways policy recommendations | Antonia Riedel, Ecologic Institute

Antonia Riedel's presentation outlined a comprehensive strategy for transitioning European agriculture away from pesticide dependency toward sustainable, ecological food systems. Drawing on stakeholder input from workshops, interviews, surveys, and success

stories, the presentation identified entrenched barriers—agronomic, economic, institutional, and cultural—that lock farmers into synthetic pesticide use. The SPRINT team proposed three visions for the future: reducing pesticide risk and reliance, redesigning agroecosystems, and building resilient, diversified, and socially equitable food systems. These are supported by structured transition pathways spanning cognitive change, agricultural practice, policy reform, and market transformation. The Common Agricultural Policy (CAP) is seen as a key enabler, though its current eco-schemes and conditionality mechanisms often fall short of supporting genuine crop rotation and biological control. Policy recommendations include strengthening GAEC standards, establishing pesticide-specific Integrated Pest Management (IPM) practices, revising educational curricula, investing in independent advisory services, and embedding pesticide reduction in food procurement strategies. Ultimately, the presentation calls for binding national targets, multi-annual funding, and a systems-based governance approach to support a just, long-term transition.

2.2.7 Final Panel Discussion

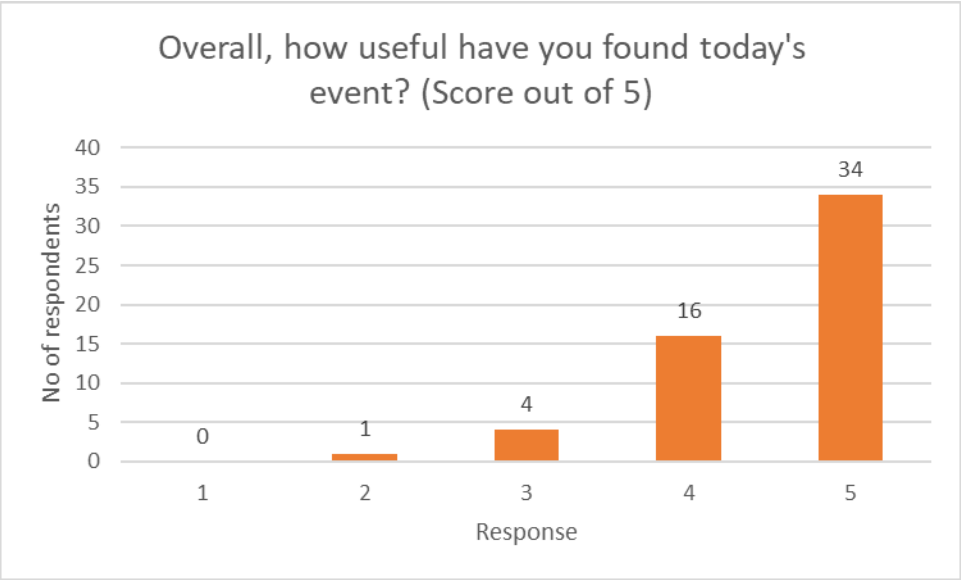
Moderator: Matt Reed, University of Gloucestershire. Panellists: Aymeric Berling, DG AGRI, European Commission; Joost Vlaming, FAO; Max Schulman, Copa Cogeca; Kristine De Schamphelaere, PAN Europe; Violette Geissen, Wageningen University & Research; Antonia Riedel, Ecologic Institute

In the final panel discussion of the day, contributors each answered the question: "what is the most urgent enabler to unlock pathways to sustainable plant protection?". 'Knowledge' was the key enabler cited by several participants, who highlighted the importance of advisory services and education for farmers and the implementation of the EU's Sustainable Use of Pesticides Directive (SUD). Aymeric Berling highlighted the CAP as providing a vehicle for not only advice but also finance for farmers who are adopting more sustainable plant protection methods. Complementing knowledge, a mindset change among farmers and consumers will enable greater sustainability, said Antonia Riedel - one that recognises the need for a reduction in pesticide use. Arable farmer Max Schulman called for more access to biocontrol methods of plant protection, pointing to a lack of products on the market. The FAO's Joost Vlaming described barriers faced by authorities in low- and middle-income countries, who have far fewer resources than their European counterparts to assess pesticide products before registering them.

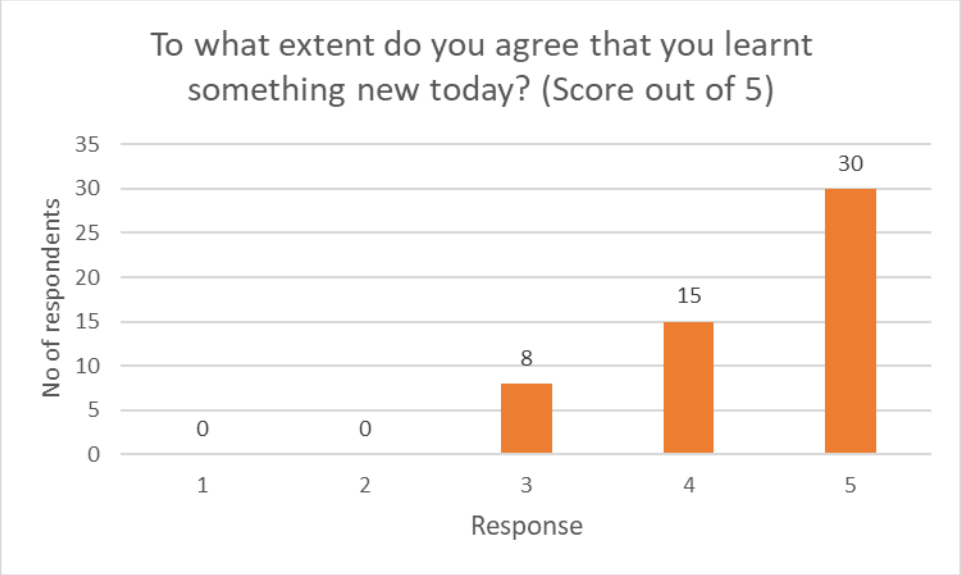
2.3 Delegate feedback survey

At the end of the event, a survey was issued to delegates requesting feedback. 55 of the delegates responded. The feedback was overwhelmingly positive.

91% of respondents felt strongly that the event was useful overall (selecting either '4' or '5' on a scale of 5).



85% felt strongly that they had learnt something new (selecting either '4' or '5' on a scale of 5).



Event strengths

Survey respondents made a number of positive comments about the breadth and the quality of SPRINT's research. For example:

"Thank you for organizing such an excellent event that addressed many important and relevant issues."

"Very useful and very insightful, SPRINT project is much bigger than I had imagined"

"Todays session was full of good insightful presentations and eloquent panelist driving to adoption of organic pesticide uptake by plants."

"impressive and a lot of excellent works have done regarding the risk of pesticide use"

Positive comments were also made about the farmers' contributions. For example:

"Good summary and enjoyed the additional farmer 'good story' anecdotes. We need to have more farmer inputs, understand their needs."

"Nice examples from farmers and good approach on showing the recommendations for policy after each part.

Areas for improvement

Suggested improvements to the event largely focussed on the delivery of the presentations. Several respondents suggested that the speakers should communicate more accessibly for a diverse audience, and that presentations were too data-dense. Some also indicated that fewer or shorter presentations would be better, and/or delivered at a slower pace. For example:

"Be careful with too much data in slides, PPTs are to show overview and conclusions."

"Plenty of information (maybe a bit too much for one day :)) I was aware of research results but not that detailed yet."

"Slightly problematic is that the researchers presented their findings, as if there was an audience of scientists... it would have been great if the presentations would have been adapted for the diverse audience that attended"

"too fast and too many presentations for only 1 day."

Some online participants commented that they could not read the presentations well:

"Too bad the resolution of the online screen was low so you could not read the data well."

"I am very much looking forward to viewing the decks, as so much of the information presented was invisible to online participants"

2.4 Live illustrations, and outlook

To augment the presentations and provide a talking point for delegates, a live illustrator, Amanda Steer was at the event. Her accessible illustrations of the presentations were displayed on a screen at the venue.

The illustrations also provide material to accompany future public communications surrounding the project. Two example illustrations are below.

The conference attracted considerable media interest with a news item produced on the front page of De Volkskrant (https://lnkd.in/ey8Jn-m2, a radio interview and a documentary for NTR FOCUS in the Netherlands (https://www.youtube.com/watch?v=2SRjsWFGQk8) all aired on the day.

Overall, the conference was not only an opportunity to present the project's results to a diverse audience, but also a valuable forum for exchanging ideas and perspectives. This spirit of open dialogue reflected the core values of the SPRINT project: participation and evidence-based solutions. As the project draws to a close, we are now in the final stages of ensuring that our findings reach the right stakeholders to drive meaningful and lasting impact.

Appendices

A1 Agenda

9.00	Registration and coffee
09:30	Welcome Matt Reed, University of Gloucestershire
09:40	Introductory remarks - Why this research is important Gisela Quaglia, Research Programme Officer, DG AGRI Yann Devos, Senior Scientific Officer, EFSA/CSO (online) Isabelle Baldi, Professor in Environmental and Occupational Health, University of Bordeaux
10.00	SPRINT project overview Violette Geissen, Wageningen University & Research
10:10	Pesticide regulatory context Lindsey Hendricks-Franco, Ecologic Institute
10:20	SPRINT Results: Environmental impacts (pesticide exposure, risk, risk assessment and policy recommendations) Abdallah Alaoui, University of Bern Nelson Abrantes, CESAM, University of Aveiro Paula da Silva Tourinho, Masaryk University
11:00	Q&A
11:10	Refreshments
11:30	SPRINT Results: Human health impacts (pesticide exposure, risk, risk assessment and policy recommendations) Paul Scheepers, Radboud University Daniel Figueiredo, Utrecht University Daniele Mandrioli, Cesare Maltoni Cancer Research Center, Ramazzini Institute Eoin Gunnigle, University College Cork (online)

12:20	Recommendations synthesis and policy implications Lindsey Hendricks-Franco, Ecologic Institute

12:30	Panel discussion (Moderator- Lindsey Hendricks-Franco, Ecologic Institute) Maria Anastassiadou, Scientific Officer, EFSA (online) Jacob van Klaveren, Senior Scientific Advisor at RIVM (National Institute for Public Health and the Environment) Paul Scheepers, Radboud University Daniele Mandrioli, Cesare Maltoni Cancer Research Center, Ramazzini Institute Daniel Figueiredo, Utrecht University Nelson Abrantes, CESAM, University of Aveiro
13:00	Lunch and poster session
14:00	The SPRINT Toolbox Jakub Hofman, RECETOX, Masaryk University (online)
14:20	Q&A
14:25	Results: Cost-benefit analysis Claudia Meier, Research Institute of Organic Agriculture (FiBL) (online) Farshad Soheilifard, Technical University of Denmark Adrian Müller, Research Institute of Organic Agriculture (FiBL) (online)
14:45	Q&A
14:55	Transition success stories Peter Apat, Hay milk/meat initiative (Seneno/Hay), Slovenia Francisco Torró, Surinver, Biocontrol in greenhouse peppers, Spain
15:20	Refreshments
15:40	Biocontrol Policy Domenico Deseiro, Policy Officer, DG SANTE (online)
15:50	Results: Transition pathways policy recommendations

	Antonia Riedel, Ecologic Institute
16:10	Final panel discussion (Moderator, Matt Reed, University of Gloucestershire) Aymeric Berling, Senior Expert, DG AGRI Joost Vlaming, FAO Max Schulman, Copa Cogeca Kristine De Schamphelaere, PAN Violette Geissen, Wageningen University & Research Antonia Riedel, Ecologic Institute
16:40	Closing remarks – Matt Reed

A2 Online Q&A

Question	Response
Will the recording be accessible?	The recording will be available via the SPRINT website.
Did you also do a risk assessment in addition to the hazard classification for the indoor dust samples?	We have done risk assessment in WP4 with substances we found in household dust. More to come in the next sessions.
The stakeholders list: Has industry (bioorganic and chemical) also been contacted to provide experimental (GLP) data and ecotoxicology and environmental fate expertise?	At this stage, industry stakeholders from the bioorganic and chemical sectors have not yet been specifically contacted to provide experimental (GLP) data or ecotoxicology and environmental fate expertise.
How can we speak about these topics with local authorities and producers who still think all this is an ideological issue?	From SPRINT experience: we try to focus on presenting objective scientific data, highlighting shared interests like human and ecosystem health, sustainability, and long-term productivity, rather than framing it as an ideological debate.
Some plant protection product active substances are also used as biocides, for indoor domestic use. Have you considered this, are people sufficiently aware of the	We included questions in the interviews about domestic use of pesticides, for example, whether people have pets like cats or dogs, and whether they use insecticides indoors. This helped us to distinguish

risks caused by biocides too, are EFSA active on this ?	whether substances we found in the household originated from agricultural sources or from domestic uses such as biocide sprays. However, we did not specifically assess how aware people are of the risks related to biocides.
Have also heavy metal pesticide products like copper or sulfure based pesticides been investigated in the environment, animal and human? If not, why not?	Initially, heavy metal-based pesticides such as copper and sulfur were not part of the scope, as the EC call focused only on synthetic pesticides. However, we recognized the importance of these substances, especially for soil accumulation, and therefore we included copper analysis in soil at a later stage of the project. For animals and humans, we have not specifically investigated heavy metals within this project.
in the work presented by Isabelle, it seemed like a lot of it was based on studies from outside of Europe? How much of the health effect links found were based on real world data from the Europe?	Thank you for the question. I have not seen the full data she presented beforehand. I have reached out to Isabelle for clarification on how much of the health effect data comes from European real-world studies versus studies from outside Europe. I'll aim to come back with her input later during the session or afterwards.
There seems to be a premise that there is significant exposure, through untested pathways (like dust), and we don't know the impacts. But if the impacts were significant - surely we'd be seeing that in levels of chronic disease in differently exposed population groups in Europe? Are we seeing that?	A valid point. Chronic diseases are often multifactorial and develop over long periods, so clear population-level signals may not always be visible. This is why cohort studies and biomonitoring are so important. And actually, we'll be discussing these health aspects, exposure and risk assessment in more detail in the next session.
In monitoring work, Abdallah found several non-approved pesticides. Is it scientifically robust/appropriate to consider them alongside approved pesticides? Because unless you are suggesting they are being used illegally, then they are not pesticides -	Yes, these substances may not currently be approved or legally used, but from a scientific perspective, their presence in the environment remains relevant. Whether due to persistence, past use, or unauthorized application, they contribute to overall

they are environmental contaminants/pollution.	exposure and potential risks, so it is important to monitor and report them. Technically, many of these substances fall under the broader category of pesticides, even if they are not currently being applied as plant protection products. In SPRINT, we monitor these substances because of their potential to contribute to overall exposure, whether due to current use, past use, or other applications such as biocides. But I fully agree that when presenting results, it's important to be clear about whether substances are currently authorized and actively used, or whether they represent legacy or non-agricultural exposures. Thanks for raising this.
Saying glyphosate is probably carcinogenic does nothing to stop polarisation of the debate or show you are working in a science and evidence based way. Regulators around the world, including the EU, have found this is not the case - it is simply not supported by the scientific evidence.	
How confident are you that plant protection products banned in the EU are really not used in the EU ? There seem to be concerning reports from Europol on the issue, I have seen reports that up to 20% of pesticides in EU are fake, counterfeit or banned products ?	In SPRINT, we worked with farmers who voluntarily participated not only by giving access to their fields but also by providing personal samples for biomonitoring. While, as with any self-reported data, absolute certainty is never possible, the level of trust and openness was very high. We have no indication that unauthorized products were used, and investigating illegal use was not part of our study objectives.

Question to Nelson & Paula: in the pesticide mixture experiments, did you use the active ingredient only, or the formulae as used in farming? Is there evidence that additives can make a mixture more toxic ? I have heard this is true for Roundup / Glyfosate and bees	great question, thanks Live answered.
How do you distinguish between pesticide exposure that has occurred from EU use, and exposure resulting from use on food/crops in other countries around the world and imported into the EU?	In the Duplicate Portion Analysis, we analyzed the actual food consumed, distinguishing between organic and conventional, but not between EU and non-EU origin. So it reflects total dietary exposure. It would definitely be interesting to explore EU vs non-EU origin in more detail in future research. It's true that part of the dietary exposure may reflect imported food. But in the real world, EU citizens do consume both EU and non-EU food products. So this represents real exposure to EU populations. At the same time, much of SPRINT's environmental, occupational and household biomonitoring data directly reflects EU agricultural use, which makes the findings very relevant for EU policy discussions. But you're absolutely right that in future studies, further distinguishing food origin would provide even more detailed insights.
perhaps this is a very naive question, but wouldn't you consider distributing wristbands to a wider population in a controlled way in a future project, even beyond the selected farms? Wouldn't that	A very good point. It was not within SPRINT's scope, and scaling up such biomonitoring would require significant resources for sampling and chemical

have the potential to provide a huge data set (and scientific pull?) and a broader picture of the population involved... and therefore greater consistency in the results obtained and education about overuse of pesticides in the home environment?	analysis. But definitely something to consider for future studies!
To what extent does ADI x 10 and ADI x 100 reflect realistic levels of exposure?	Great Qn. The levels of exposure recorded in SPRINT samples was lower than the ADI. The aim for us was to see if negative impacts/microbial influence even at ADI level, with v little research underatken at this level. Also, to run an animal study of this nature (vv low concentrations), the more complex design, as in realtity you would need 1000s of animals to see any meaningful data if doses used that were recorded in environment/human samples
What actions are being taken to prevent the significant harm that Highly Hazardous Pesticides cause to pollinators?	Under EU pesticide law, environmental risk assessments must include impacts on honeybees, with growing attention to wild bee species. In SPRINT, we tested real-world pesticide mixtures on honeybees and predatory mites. Toxic effects were observed mostly at high doses, but we also saw sublethal impacts on foraging and gut microbiota at lower levels. This shows that mixture effects deserve more attention in future pollinator risk assessments.
Press question: What policy changes might the EFSA (want to) consider based on the SPRINT project?	we did not have time to pose your question directly to Maria. Did you deduct an answer from her talk nevertheless? Or do you need more info. If the later is the case we can pose your question to her via email.
SPRINT identifies some new routes of exposure. And it has does a great job to monitor and collect comparable data from across Europe. But can it say what this means in terms of actual harmful impacts	

on human health? And if it has shown this, how do these harmful impacts compare in scale to impacts of other factors, like exposure to other environmental pollutants, drugs and diet?	
Second-generation anticoagulant rodenticides (SGARs) are harmful to wildlife, especially raptors. What actions are being taken to prevent their use?	Thank you for raising this important issue. This topic is falling outside SPRINT's scope. It would be best to consult the regulatory experts working specifically on biocides and wildlife protection.
is anyone/EFSA considering air pollution caused by pesticides ?	Yes, EFSA's environmental risk assessments (ERA) for plant protection products do include consideration of airborne exposure to pesticides, such as drift from spraying or volatilization, and their deposition into air and surrounding areas. If there is a more targeted question for EFSA we can forward these. In SPRINT, we specifically measured air concentrations of pesticides using TIEMS samplers deployed in the field and around farms.
It looks like the GenAp assumes if a pesticide is available it will be used to the maximum level possible ? This would be a very conservative approach - farmers and their advisers make decisions to use pesticides based on levels of pests, weeds and disease, not just apply them because the product label says they can, and do this to the maximum allowable level.	live answered
Thanks, Jakub. There's also a concept called "the whole cup," which refers to the cumulative exposure to pesticides and chemicals we encounter throughout the day—from the food we eat to the environment around us, from morning until night. Do you have any thoughts on this?	This is very challenging as this goes across different agendas and authorities. Perhaps within current policies (zero pollution) and related projects (PARC) this will be advanced to more complex and (therefore) realistic scenarios

The Toolbox appears to be making some very significant statements. Is SPRINT saying that 221,143 cases of Metabolic syndrome in the Netherlands are caused by exposure to glyphosate?	The Toolbox uses existing epidemiological data combined with our measured exposures to estimate potential population-level impacts, but these are modeled estimates, not proof of direct causation. Health Impact Assessment is a common tool used, for example, in air pollution policy to explore possible public health relevance. Of course, these estimates depend on the available data and assumptions. For more detailed questions about the methodology, my colleague Anke Huss, who leads this part of the work, will be best placed to provide further explanation when available. More targeted questions about this can be sent to sprint@wur.nl, unfortunately our colleague responsible (A. Huss) for this part cannot join today.
Did I understand correctly that you have collected use/registry data and completed GenAPs for a few (3?) countries? Will you do the same for more or all EU countries?	Hi, here details on GenAPs underlying work: https://sprint-h2020.eu/index.php/my-sprint/project-documents/registered-users/confidential-deliverables/406-d5-2-generalized-ppps-application-patterns-from-regional-to-eu-level/file. Please note the A1-A4 annexes -> output of GenAp for Czechia, Austria, Portugal, Estonia
In Jennifer's work - sulphur and copper were mentioned - my understanding is that these are allowed to be used in organic production - so I'm not clear why they are being highlighted?	Indeed sulphur and copper are allowed in organic production- nevertheless they were reported within our CSS to be used the most in terms of frequency in organic and non organic farms
In Johan's work - were the 'costs' corrected on the basis of outputs, i.e. in the assessment of costs was the difference in yield taken into account?	The analysis is done at the farm level, and unfortunately in FADN we do not have data on yields for all crops.
Is it appropriate to present total damage costs without presenting any value for the societal benefits of pesticide use?	live answered. Yes, it illustrates the problem and points to key leverage points for action. Clearly, the

	benefits have to be pointed out as well - but if you monetize both and add them up, many details are lost. And there is a big danger that the result is negative for agriculture, as the headline in the context of the FAO TCA work, where it is stated that in total, agriculture destroys more value than it produces - does not make sense at all as we have to eat in any case.
I'm not sure how representative a dairy farm is of overall pesticide use in the EU, and how to reduce such pesticide use and risk ? Is this a zero grazing system, do the dairy cows go outside to graze or the grass is cut and brought in to them ?	
does the Spanish speaker believe that farmers are only willing to try non-chemical solutions when the chemical products don't work anymore ? with increasing resistance to pesticides it seems we could be on the road to nowhere/being unable to grow certain crops anymore in the EU due to pesticide resistance and being unable to control certain pests or weeds	To provide you with a more detailed and expert perspective, I will forward this question to Mr. Torro.
In the presentation on biological control in peppers - can you explain the reference to using acrinatrin and lufenuron, as these actives were banned in the EU some years ago?	no need to answer - I see now that this case study is referring to a transition that started 30 years ago.
if biocontrol products are more expensive than chemical pesticides, I presume that farmers will only switch to them if the chemical products don't work anymore ?	quick feedback from Adrian: "or if taxes on pesticides are high enough so as to make them more expensive than the less harming biological pest control products/strategies; or – for some active ingredients – if those latter are banned. "

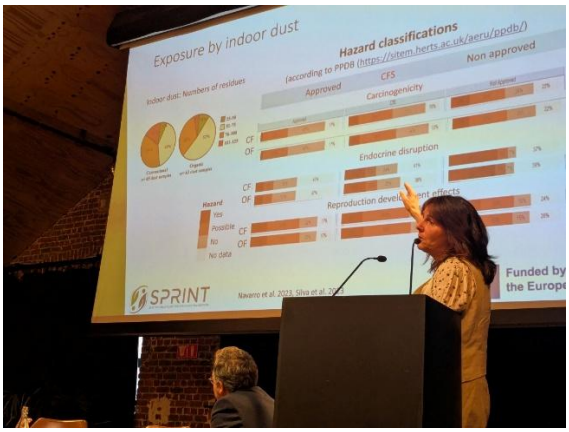
	and more, from Farshad: "Yes, that is a challenge, and higher costs are a major barrier to adopting biocontrol products, but in my opinion, some other drivers should be considered for making a final decision, such as chemical resistance, regulatory pressure (as mentioned), government incentives and support for biocontrol products, etc."
To what extent have Spanish pepper growers adopted biological control - the transition presented appears to have happened 20-30 years ago. What is the opportunity today for pepper growers to transition? Or are they all generally using biological control as the mainstay of crop protection (this is the norm in the protected edibles sector in UK)?	
The increase in biopesticide applications is great news. But biopesticides are not like-for-like replacements for other pesticides - they are more specific and do not always provide complete control - so you may need to use multiple biopesticide solutions to replace another pesticide.	
isn't it true that pressures on pollinators and biodiversity are more due to loss of habitats than use of pesticides, and reducing pesticide use without addressing loss of habitat won't be effective?	it's true that habitat loss is a major driver of pollinator and biodiversity decline, but pesticide use is also a significant and additional threat to these (and others) organisms and endpoints. both must be tackled in a more integrated way than used nowadays.
I've heard about the importance of new crop varieties today. Does SPRINT advocate the use of precision breeding to create these varieties quickly?	

Why are the policy recommendations talking about pesticide reduction, when most of the day has been spent talking about risk of using pesticides - surely the SPRINT policy recommendations should be focussing on reducing risks associated with pesticide use?	we need to restrict the pesticides in the market (use) to reduce risks. the type of pesticide targeted is of course crucial, that is also why we have invested in the development of pesticide prioritization indicator which accounts for the hazard profile of the pesticide, see here: https://www.sciencedirect.com/science/article/pii/S0160412023005536?via%3Dihub#f0010

A3. Photo gallery

The conference room

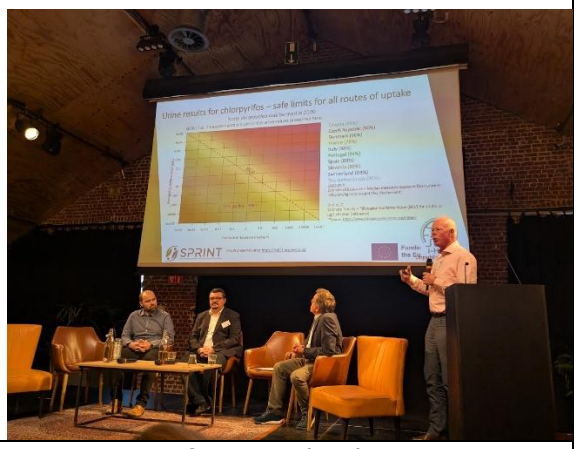
Presentation from Gisela Quaglia, DG Agri



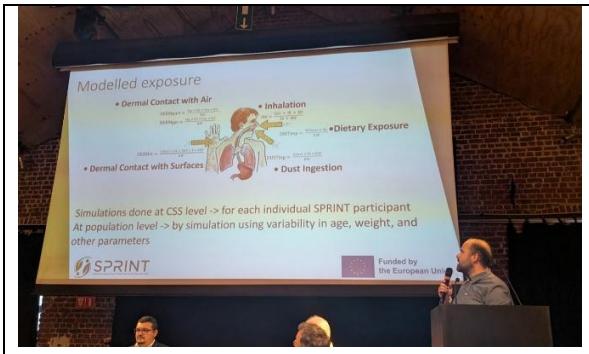
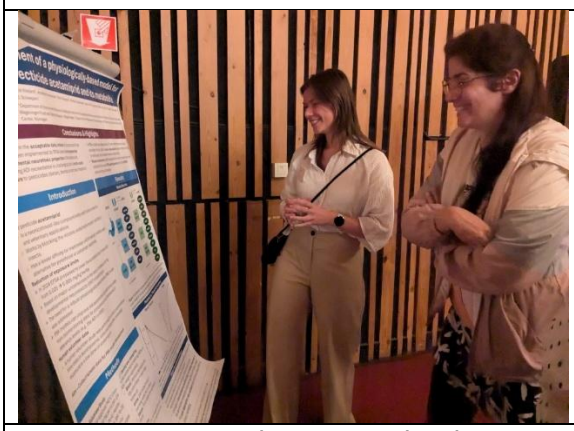
Presentation from Violette Geisen

Presentation from Lindsy Henricks-Franco

Presentation from Nelson Abrantes



Presentation from Paul Scheepers

		
Presentation from Daniel Figueiredo		Morning panel discussion – Paul Scheepers, Jacob van Laveren and Daniel Figueiredo (left to right)
		
Poster session with Nina Wieland		Presentation from Francisco Torró
Final discussion panel with Max Schulman, Kristine De Schamphelaere, Joost Vlaming, Antonia Riedel and Matt Reed (left to right)		

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