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A warm welcome

...to our first ever SPRINT newsletter, which will share updates about our EU-funded Horizon 2020 project. Our project will run for 5 years and will make an internationally valid contribution to assess integrated risks and impacts of pesticides on environment and human health, both at regional and European level.



SPRINT will also inform and accelerate the adoption of innovative transition pathways towards more sustainable plant protection in the context of a global health approach. We will achieve our goals by carrying out cutting-edge research in 11 case study countries, 10 of which are in Europe and the remaining in Argentina. We hope you enjoy our first newsletter.

Please get in touch with us if you have any questions.

- Violette Geissen, SPRINT project coordinator

sprint@wur.nl



Introducing the SPRINT project

Most farmers rely on plant protection products (PPPs) to maximise crop yields. However, some PPPs are potentially harmful to environmental, animal and human health. Data on the risks and impacts associated with PPPs' are, at present, fragmented and incomplete. There is, therefore, a need to deliver an integrated approach to fill this data gap.

SPRINT will develop and test an integrated global health approach to assessing the risks and impacts of PPPs on environmental, crop, livestock and human health. The project will also accelerate the transition towards more sustainable PPP use.

KEY OBJECTIVES

- Engage with stakeholders to identify their knowledge needs and improve awareness of and trust in integrated risk assessments of pesticides
- Assess PPP component mixtures & distribution in the environment (soil, water, air), crops, livestock and humans and the related health state of organisms & humans in different farming systems
- Estimate direct & indirect PPP residue exposure levels for selected organisms, crops, livestock and humans in the case studies
- Develop laboratory tests for measuring the effects of PPP mixtures on environmental, crop, livestock and human health
- Develop a Global Health Risk Assessment Toolbox for risk and impact assessment of PPP residue mixtures on the environment, crops, livestock and human health, linking exposure to PPP residue mixtures to health impacts
- Assess integrated risks, costs and benefits of PPP use in different farming systems at micro- and macroeconomic level, including internal and external costs of PPP use
- Propose transition pathways towards more sustainable plant protection, provide policy recommendations and develop a research agenda on sustainable plant protection

EXPECTED OUTCOMES

Monitoring



Improved monitoring of pesticide uses and pressures on health and the environment, by developing an integrated Global Health Risk Assessment Toolbox

Transition



Development of transition pathways towards the sustainable use of PPPs

Awareness



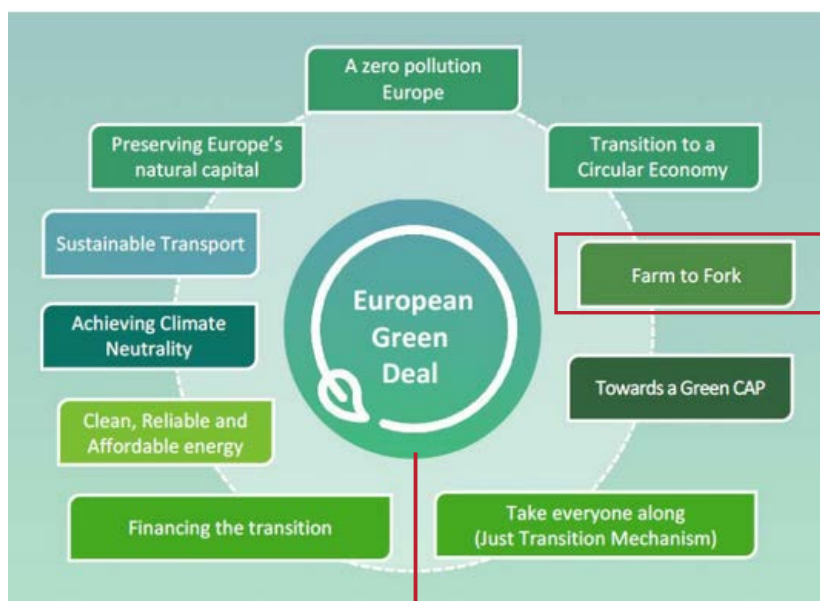
Improved farmer, consumer, and citizen awareness of and trust in global health approaches to PPP risk and impact assessments

MAP OF THE SPRINT CASE STUDY COUNTRIES (GREEN) AND OTHER COUNTRIES INVOLVED (YELLOW)



The policy context of SPRINT

The SPRINT project will support several EU policies, from broad overarching strategies to pesticide regulations and policy evaluations.



REFIT: PPP regulation

REFIT (the regulatory fitness and performance programme) is an ongoing evaluation programme which checks that EU legislation is 'fit for purpose'.

SPRINT will address some of the key areas the pesticide REFIT identified as needing improvement:

1. Cumulative risk assessment
2. Using green diplomacy to promote our green agenda for pesticides
3. Better enforcement of the Maximum Residue Level Regulation

The European Green Deal

The European Green Deal aims to overcome environmental decline and the threat of climate change by making the EU's economy more sustainable.

A significant part of making the EU's economy sustainable will require a transformation of the food system. SPRINT will contribute to this through one of the key strategies of the green deal, 'Farm to Fork'.

Farm to Fork (F2F)

The F2F strategy is a central part of the European Green Deal. The strategy has several aims which SPRINT can feed into. Most importantly, the project will contribute to is the goal of reducing PPP use by 50% by 2030. In addition, SPRINT contributes to the F2F aim of a sustainable food system which has a neutral or positive impact, reverses biodiversity loss, and ensures food is safe for everyone.

Sustainable Use of Pesticides Directive

The Sustainable Use of Pesticides Directive (2009/128/EC) aims to achieve sustainable use of PPPs in the EU by promoting the use of integrated pest management and alternative approaches for controlling pests.

SPRINT will contribute to the success of this directive by identifying transition pathways towards reducing reliance on PPPs.

Other EU policies SPRINT will contribute to:

1. EU Biodiversity Strategy for 2030
2. EU Pollinators Initiative
3. Water Framework Directive
4. Zero Pollution Plan



Highlights from the SPRINT kick-off meeting



The SPRINT Kick-off meeting (KOM) took place between 12 and 15th October 2020. Due to the COVID-19 pandemic, this KOM was a virtual meeting. The meeting was well attended by project partners, with 61-97 attendees at any one time.

Day 1: Kick-off!

The day started with a warm welcome from the coordination team and a brief overview of the SPRINT project. The overall aim, prime outputs, and research objectives were outlined. We were also made aware of the goal of the KOM itself: to agree on the activities and outputs which will be achieved in the first 18 months of the project. Next, there was a session hosted by the European Commission, who set the policy context of SPRINT (see page 3). An overview of how SPRINT will link to several policies was provided, including the European Green Deal, the Farm to Fork Strategy, pesticide regulations and the Water Framework Directive. We were then introduced to the project advisory board for the project (see page 5). Work packages 1-3 gave presentations in the afternoon to explain what their roles are within the project (see pages 6-8).

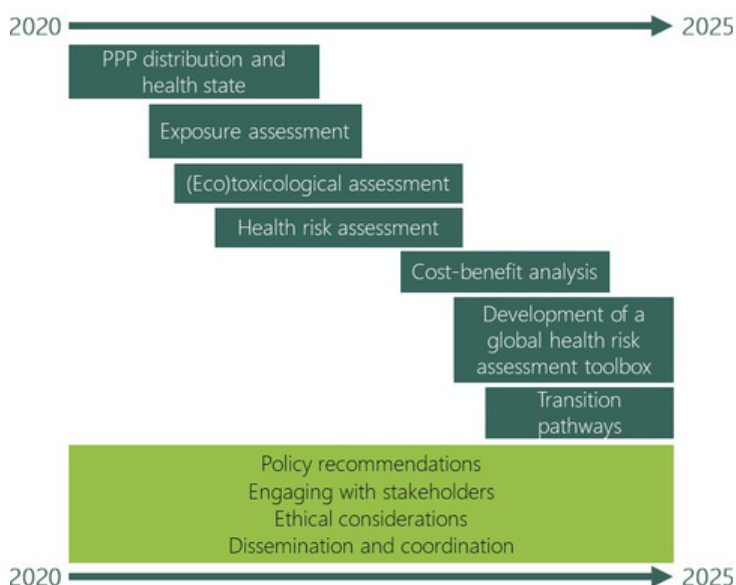
Day 2: Learning more about our work packages

Day 2 began with overviews of work packages 4-8 (see pages 9-13). In-depth discussions were then held to explore how long farmer participants may be interviewed for and what the benefits of participating will be.

Day 3: Planning

The final day of the KOM largely surrounded the data management plan. There was also a presentation from work package 10 which outlined and encouraged discussions surrounding the ethics requirements for the project. Detailed planning for the next 18 months was then undertaken to ensure the project achieves its deliverables on time.

TIMELINE OF KEY OUTPUTS



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Introducing the SPRINT advisory board



Gabriela Fait - European Food Safety Authority (EFSA)

Gabriella Fait works at EFSA in the pesticide peer review unit assessing the environmental exposure consequent from the intended uses of plant protection products. Her background is in agricultural chemistry focusing on the fate and behaviour of pesticides in the environment (via both modelling and experimental assessment).



Dieter Schrenk (University of Kaiserslautern)

Dieter Schrenk is the Head of the Department of Technische within the Universität Kaiserslautern. He has over 15,000 citations, with research including several studies on the toxicity of various substances on human health.



Annette Gatchett (NEPTUNE)

Annette Gatchett has over 30 years of experience as an environmental scientist with the Office of Research and Development in the U.S. Environmental Protection Agency. She has managed programs that included innovative treatment technologies, decision support tools, and human health assessments. She has managed organizations with as many as 375 Federal staff members and has held several executive positions.



Luca Montanarella (European Commission)

Luca Montanarella has worked as a scientific project manager for the European Commission within the European Soil Data Centre since 1992. His research has resulted in almost 15,000 citations from over 380 research items.



Gottlieb Barch (University of Evora)

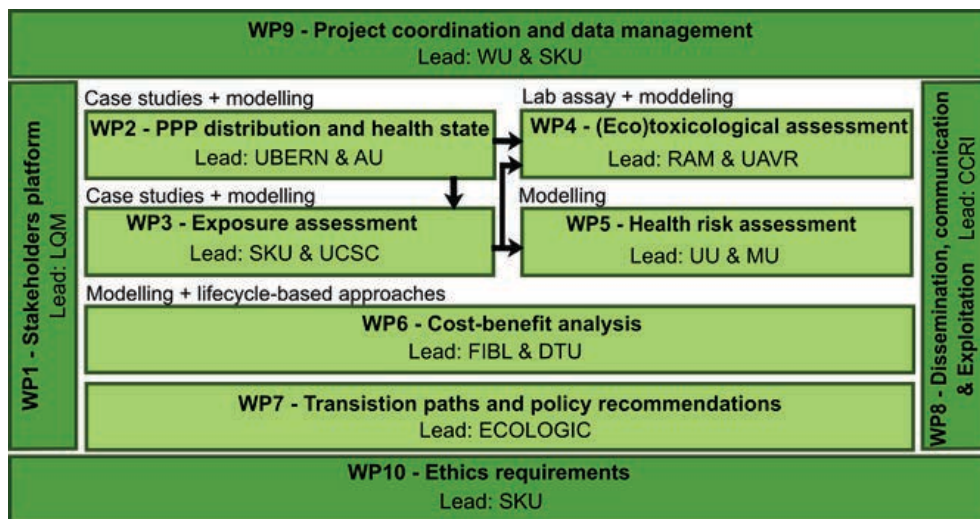
Gottlieb Barch is the vice-director of the Institute of Mediterranean Agricultural and Environmental Sciences at the University of Evora in Portugal. His research focuses on soil conservation and soil carbon dynamics. His main interests include sustainable land use and conservation agriculture systems. He has also been involved in three other H2020 and ERAfrica projects.

Introducing the SPRINT gender committee



The SPRINT gender committee (from left to right) consists of Margreet van der Berg, a senior researcher in gender studies at Wageningen University, Felicitas Bachmann, a senior researcher in socio-economic and cultural issues at the University of Bern, and Ana Frelih-Larsen, a senior fellow specialising in agriculture and soil at Ecologic.





Introducing the SPRINT work packages

SPRINT consists of 10 distinct work packages, all of which will contribute to achieving the goals of the project. The following pages will provide an overview of each of these work packages.

Work package 1: Stakeholder platforms

WP1 deals with the embedding of the multi-actor approach and extension of the stakeholder networks at the respective case study sites participating in SPRINT.

Stakeholders will actively participate in most of the research and innovation activities in the entire project, from the inventory phase at case study sites to the cost-benefit analysis of farming scenarios through an independently chaired Project Stakeholder Advisory Group (PSAG).

The specific objectives for WP1 are to:

- Establish and coordinate the PSAG.
- Establish and connect stakeholders' platforms at CSS, regional and (inter)national level.
- Provide a framework for stakeholder involvement and organize workshops at each CSS, and related follow-up activities.

Meet the WP1 leader: Paul Nathanial



Paul Nathanail is the technical director of contamination assessment and remediation for LQM, which offers specialist services to assess and remediate contaminated sites. Paul specialises in contaminated land management and engineering technology. He has worked with several stakeholders relevant to SPRINT and has delivered training to several clients. He is, therefore, well placed for fulfilling the objectives of WP1.



Work package 2: Pesticide distribution and health status

WP2 focuses on the harmonisation of monitoring of PPP distributions in the ecosystems, plants, animals and humans in 11 CSS across Europe and the related health status.

The specific objectives for WP2 are:

- To develop a study protocol for a diagnostic approach with respect to data collection for EPAH health, standardized across all CSS and related capacity building of stakeholders.
- To deliver a critical review and database of available agricultural and public health data related to PPPs to optimize the diagnosis of ecosystem, plant, animal, and human health.
- To collect data in the CSS on PPP distribution and EPAH health following a harmonized protocol, analyse them and identify patterns and relations.
- To collect input data for the exposure models applied in WP3.
- To develop, test and validate the integrated detailed diagnostic approach.
- To identify innovative and sustainable land management practices to reduce reliance on PPPs.

Meet the WP2 leaders: Abdallah Alaoui and Vivi Schlünssen



Abdallah Alaoui is a senior research scientist in the Centre for Development and Environment at the University of Bern. His research interests include soil management and protection and the evaluation of the impact of land use and climate change on soil and flow processes. He is also involved in another Horizon-2020 project, SoilCare.



Vivi Schlünssen is a Professor in the department of public health at Aarhus University. She specialises in epidemiology, respiratory diseases and exposure assessments. She has over 350 research items and has accrued over 4000 citations.



Work package 3: Exposure assessment

WP3 will deal with the development of exposure estimates for direct and indirect exposures to PPP mixtures relevant to EPAH health by integrating existing data with new data obtained from CSS and come up with innovative exposure assessment models.

The specific objectives for WP3 are:

- To integrate exposure estimates relevant to EPAH health using the Dutch Integrated Exposure Modelling Framework (OBO), which includes IDEFICS, PEARL, BREAM, and OPS-St.
- To calculate exposure of non-target species in ecosystems and uptake in crops with FOCUS fate models using existing datasets and new data from CSS (in connection with WP2), and improve FOCUS fate models including missing modules such as wind erosion.
- To derive direct exposure from existing data on dietary intake and PPPs' residues in food for humans and feed for animals.
- To estimate non-dietary indirect exposure for animals and humans (inhalation, skin uptake, unintentional ingestion) with the OBO modelling framework, parameterized with existing and new data from our CSS.
- To integrate existing exposure models and calibrate these models for exposure of farmer's families, non-farmer rural population and consumers, using urinary excretion of metabolites to estimate internal exposure and uptake of PPPs by reverse dosimetry using experimentally calibrated PBPK models for humans.
- To perform sensitivity analyses and present EPAH exposure estimates with information on variability uncertainty, e.g., the influence of data gaps and assumptions

Meet the WP3 leaders: Paul Scheepers and Marco Trevisan



Paul Scheepers is an Associate Professor at Radboud University. He is interested in research of safe use of chemicals the health risks of exogenous substances. This is achieved by analysis of biological indicators (biomarkers) of exposure, susceptibility and effect.



Marco Trevisan is a Professor of agricultural chemistry at the University of Cattolica, in the department of food science and technology for a sustainable agri-food supply chain. He has been dealing with the effects and persistence of plant protection products in the environment and in food for over 35 years.



Work package 4: (Eco)toxicological assessment

The main objectives of WP4 are to assess the effects of PPP mixtures on:

- Terrestrial and aquatic ecosystems, using a stepwise approach, from single single-species tests with non-target organisms to multi-species microcosm, allowing also to assess the potential for trophic transfer
- Animals, by exposing chickens directly (feed), or indirectly (inhalation, skin), to PPP residues and monitoring their health and gut microbiome composition,
- Animal models of mood disorders; and the associated changes in microbiota, immune and endocrine readouts, metabolomics markers and gut physiology, and humans by using in vitro and in vivo experiments.



Meet the WP4 leaders: Daniele Mandrioli and Nelson Abrantes



Daniele Mandrioli is the Director of the Cesare Maltoni Cancer Research Center of the Ramazzini Institute. He conducts research on environmental toxicants and carcinogens and Evidence Based Toxicology (EBT). His research includes the design and development of bioassays, investigations on the role of aneuploidy in carcinogenesis and reproductive and developmental toxicity, the analysis of different chemical regulations, systematic reviews in environmental and occupational health.



Nelson Abrantes is an Assistant Researcher at the University of Aveiro. He is interested in biomonitoring and has undertaken stream assessment research to study aquatic communities and its integration with ecotoxicological tools. For example, he recently co-authored a paper exploring whether a parasite could adapt to the presence of a fungicide (tebucanazole).



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Work package 5: Health risk assessment

The main objectives of WP5 are:

- To develop an integrated modelling and mapping platform for risk and impact assessment of PPPs' residue mixtures on EPAH health - the Global Health Risk Assessment Toolbox.
- To integrate the results across the different WPs – CSS results, data generated on exposure, effects and risks, and models - as well as data available in PPPs related databases and information systems and new scientific literature results.
- To upscale the toolbox to regional and European scale and test its global applicability within FAO Pesticide Registration Toolkit.
- To bring together the different scientific disciplines of the SPRINT research groups to share knowledge, synthesize findings, and thereby support the further research of pesticide exposure and health impacts in an integrated way.

Meet the WP5 leaders: Anke Huss and Jakub Hofman



Jakub Hofman is an Associate Professor at RECETOX (Research Centre for Toxic Compounds in the Environment) at Masaryk University. He is a soil ecotoxicologist and has been cited over 1000 times since 2015.



Anke Huss is an Assistant Professor in environmental epidemiology with a special focus on environmental exposures that display spatial distribution. She is involved in advanced methods of exposure assessment including modelling of diverse exposures (electromagnetic fields, pesticides, perceived exposures, noise and others) and has evaluated effects of these exposures regarding a wide range of outcomes.



Work package 6: Cost benefit analysis

WP6 evaluates the case studies in terms of environmental and economic sustainability in a cost-benefit (C-B) analysis of different farming scenarios (C-I-O) across spatial scales.

Specific objectives for WP6 are:

- To analyse health impacts and economic burden of pesticide use at farm level across case studies.
- To quantify health damages and external costs at the farm level, considering farming system life cycles.
- To compare the performance and rank pesticide reduction strategies at farm level (ex-ante assessment).
- To develop upscaling scenarios & sensitivity analysis of pesticide reduction strategies at regional level.
- To compare the performance and rank pesticide reduction strategies at regional level.

Meet the WP6 leaders: Lucius Tamm and Peter Fantke



Lucius Tamm is the head of the crop sciences department at FiBL. His expertise is in agricultural plant science, crop protection, and plant pathology. He has over 100 research items and 1200 citations.



Peter Fantke is an Associate Professor in quantitative sustainability assessment at the Technical University of Denmark. His research focuses on assessing the fate, exposure, and effects of chemicals. He is also the director of USEtox, the UNEP/SETAC scientific consensus model for characterizing chemical toxicity and ecotoxicity.

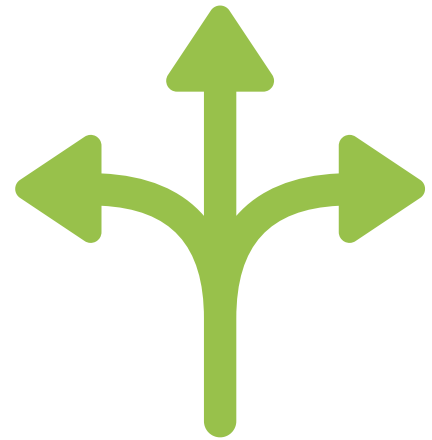


Work package 7: Transition pathways and policy recommendations

WP7 aims to translate SPRINT's scientific results into workable policy proposals and a supporting research agenda by building on a structured process of engagement with stakeholders.

WP7 has the following specific objectives:

- To identify lock-ins and barriers in existing farming scenarios and governance of PPPs that prevent sustainable use of PPPs
- To explore transition paths with stakeholders towards sustainable plant protection in the context of a global health approach.
- To develop innovative policy approaches in the field and formulate a supporting research agenda.



Meet the WP7 leader: Ana Frelih-Larson



Ana Frelih-Larsen is a Senior Fellow at Ecologic Institute and coordinates the Institute's activities on agriculture and soil. Her areas of expertise are soil and water protection policies and their role in climate change mitigation and adaptation. She specializes in the implementation of the Common Agricultural Policy (CAP), rural development programs, and the Water Framework Directive (WFD).



Work package 8: Dissemination, communication and exploitation

The SPRINT concept and methodology undertaken will lead to major scientific and societal advances in the use of pesticides. Appropriate dissemination, exploitation and communication measures are crucial to leverage the impact of project results by wide-scale adoption and use of these results by consortium partners and all stakeholders outside the consortium.

The specific objectives for WP8 are:

- To set up and implement SPRINT's Dissemination and Exploitation strategy, ensuring the project's results are distributed and utilised as broadly as possible, taking advantage of tailored dissemination channels and messages.
- To set up and implement SPRINT's Awareness-raising and Communication strategy fostering dialogue on societal issues related to the SPRINT project with the general public.
- To draft a data management plan and facilitate standardized data preservation, access and governance in SPRINT.

Meet the WP8 leader and chair of the dissemination, exploitation and impact committee: Jane Mills



Jane Mills is a Reader at the Countryside and Community Research Institute (University of Gloucestershire). Her main research interests include the social aspects of agri-environmental policy, sustainable agriculture and environmental management. She is particularly interested in understanding farmer behaviour in the context of agri-environment and sustainable soil management and in researching collaborative institutional arrangements and knowledge exchange processes which effectively reconcile agricultural production and environmental quality objectives.

Jane has led the dissemination work package for several other EU projects, including for RECARE and SoilCare. Jane is also the chair of the dissemination, exploitation and impact committee for SPRINT.



Work package 9: Project coordination

This WP will address day-to-day coordination and management of the overall project. WP9 will foster collaboration between the SPRINT partners to ensure compliance with the EC's requirements, timely reporting and efficient administration and will facilitate adequate decision-making.

The specific objectives for WP9:

- To warrant effective administrative, financial, ethical and legal coordination.
- To prepare, conclude and maintain the Consortium Agreement from the onset of the project until the end.
- To install the management bodies and implement the meeting and reporting processes of the project to support the interaction and collaboration between partners both within and between WPs including the timely exchange of materials, data and results and other information.
- To monitor the project work plan and achievement of the objectives, deliverables and milestones; identify any problems early and find solutions to counteract or rectify the problems.
- To timely submit the contractual periodic EC reports and maintain good lines of communication with the EU Project Officer;
- To monitor compliance with the ethical requirements as set out in Chapter 5.
- To manage gender equality issues in the project.

Meet the WP9 coordination board



Overall project coordinator: Violette Geissen is a Professor in the soil physics and land management department at Wageningen University. She has expertise in soil degradation, pesticide transport in soils, and land management. Her research has been cited over 5700 times.



Deputy project coordinator: Coen Ritsema is a Professor of soil physics and land management at Wageningen University. He has successfully coordinated 14 EU-funded research projects. His research focuses on land-hydrology interactions at different scales, with special attention to soil physical processes and he has over 11,500 citations.



Scientific Coordinator: Paul Scheepers has a background in toxicology and environmental sciences and is affiliated with Radboud University as associate professor in molecular epidemiology and risk assessment and head of the Research Lab Molecular Epidemiology. He previously coordinated two EU projects on biomonitoring of carcinogenic substances (BIOMODEM and BIOMONECS).



Scientific project manager: Vera da Graca Silva is a research associate in soil physics and land management at Wageningen University. She specialises in studying the concentrations and impacts of pesticide residues in agricultural soils.



Scientific project manager: Paula Harkes is a research associate at Wageningen University & Research. Her main research interests span microbiology, soil ecology, and plant-soil interactions.

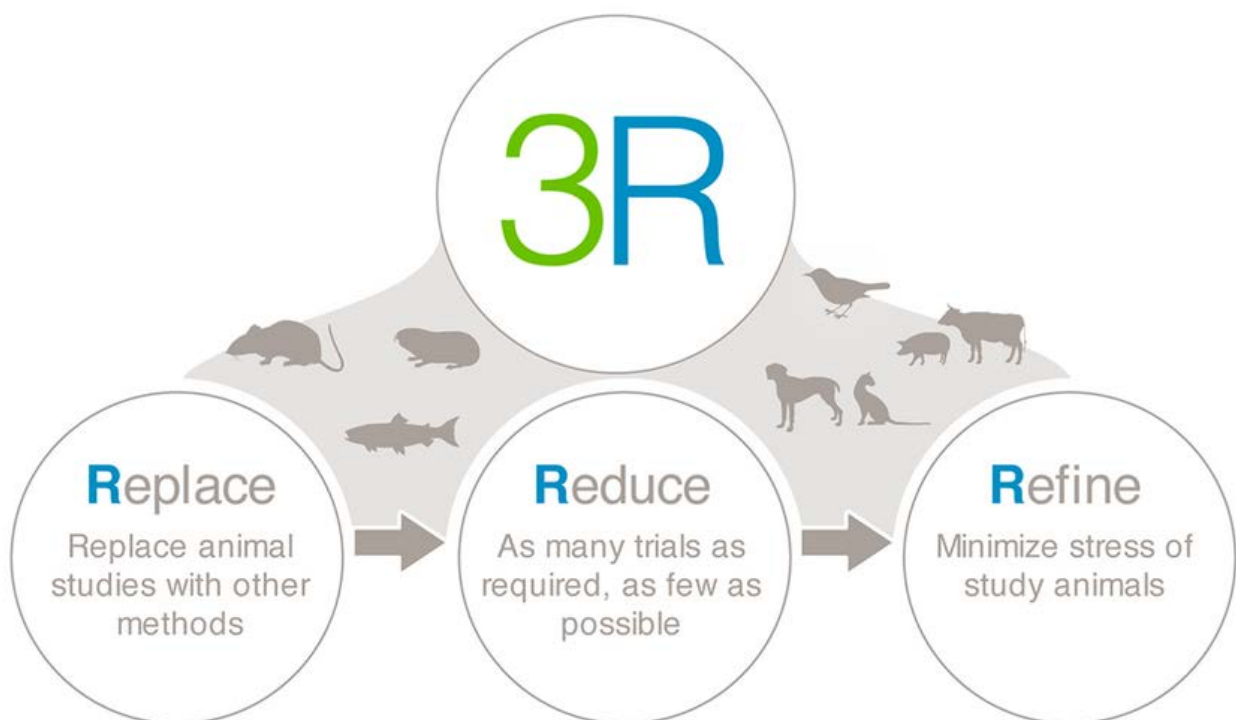


Work package 10: Ethical considerations

WP10 will secure that ethics and data protection requirements are met and that data collection is in compliance with ethics policy and GDPR. The ethics committee consist of Paul Scheepers (see p.14), Vivi Schlünssen (p.7) and Daniele Mandrioli (p.19).

The specific objectives of WP10 are to:

- Support the case study site leaders who will be gathering data from human subjects
- Support the laboratories which will involve human volunteers and/or use human cells and tissues
- Support the laboratories who will be carrying out experiments on animals (e.g., mice)
- Ensure the project is adhering to the 'replace, reduce, refine' framework to minimise the use of animals unless it is necessary



Introducing the SPRINT case studies:

Bordeaux, France

What type of agriculture is being studied in Bordeaux?

Viticulture (grapes for wine)

What are the main characteristics of the site?

The case study is located in Southwestern France in the Nouvelle Aquitaine Region. The largest region in France, Nouvelle Aquitaine has around 6 million inhabitants. Nouvelle Aquitaine has a vast wine-growing area, crucial in the regional economy, which has shaped the territory, the landscapes and the culture. The largest city, Bordeaux, is at the heart of an agglomeration of nearly 905,000 inhabitants. Nouvelle-Aquitaine enjoys an oceanic climate, with average temperatures of 12°C in the colder months and 27°C in the heart of summer.

When are PPPs applied?

Typically between April-August

Which PPPs are relied on in Bordeaux?

Conventional farmers have a wide range of PPPs they may use, including Folpet, Cymoxanil, Trifloxystrobin, Mancozeb, Tebuconazole, Boscalid, Dithianon, and Pyraclostrobin. Organic farmers often apply Sulphur, Pelargonic acid, and Copper Sulfate.



Meet the case study leader: Isabelle Baldi

Isabelle Baldi of the University of Bordeaux and EPICENE will be leading the Bordeaux case study site for SPRINT. She is a physician who specialises in epidemiology and occupational health and has been studying pesticides since 1999, mainly exploring the exposure of vineyards to PPPs. She is also involved in the VitiREV project which aims to help vine growers to reduce their reliance on pesticides.



Introducing the SPRINT case studies: Central Slovenia

What type of agriculture is being studied in Slovenia?

Silage maize grown for dairy and beef farms.

What are the main characteristics of the study area?

Small family farms (~10ha) are typical for Central Slovenia. Intensive dairy and beef farming dominates Slovenian farming (61%). Consequently, silage maize is grown in 40% of fields in a crop rotation. In total, 1156 tonnes of PPPs were sold in Slovenia during 2016. There is a heavy reliance on fungicides, which represented 74% of the PPPs sold in 2016. This reliance is because of the wet climate and as untreated product feed can contain high levels of aflatoxins.

When are PPPs applied?

Pesticides are typically applied throughout the growing season (March-October).

Which PPPs are relied on in Slovenia?

Conventional farms have several fungicides they may apply, including Acrobat, Infinito, Ortiva, Dithan, Antracol Combi, and Ridomil Gold. Organic farms have no herbicides available but do have options for controlling fungi and pest insects. They apply copper and sulphur preparations alongside bacterial PPPs such as Naturalis and Lepinox plus.



Meet the case study leader for Bordeaux: Matjaz Glavan

Matjaz Glavan, of the University of Ljubljana, is the case study site leader for Slovenia. He is a catchment modeller and has expertise in land use management. He is also a GIS specialist and comes from an agricultural background. He was a case study site leader in a previous project, iSQAPER, which is how he got involved in SPRINT.



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Introducing the SPRINT case studies: Cartagena

What type of agriculture is being studied in Cartagena?

Broccoli

What are the main characteristics of the site?

The Cartagena case study is in Southern Spain, an area which primarily grows vegetables, including broccoli. The growing season takes place between Autumn-Winter.

When are PPPs applied?

September-March

Which PPPs are relied on the most in the area?

Conventional farmers apply several herbicides, fungicides and insecticides in the area.

Herbicides include: glyphosate, bentazone, terbuthylazine, metazachlor

Fungicides include: Matalaxyl, boscalid, azoxystrobin, difenoconazole

Insecticides include: Acetamiprid, imidacloprid, thiamthoxam, methoxyfenozide, cypermethrin.

Organic farmers apply sulphur to control fungi and several insecticides including azadirachtin, spinosad, pyrethrins, and vegetable oils.



Meet the case study leader for Catagena: Francisco Alcon

Francisco Alcon is an Associate Professor at the Polytechnic University of Cartegena (UPCT). He is an agricultural engineer with expertise in agrarian economy and a special interest in economics, natural resources management, and innovation economics.



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Introducing the SPRINT case studies: the Po Basin, Italy

What type of agriculture is being studied in the Po Basin, Italy?

Vegetables

What are the main characteristics of the site?

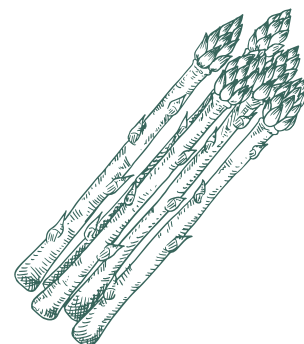
The Emilia-Romagna region in Italy has one of the last shared ownership systems in Italy. Some of the principal features of the area have remained unchanged for centuries, and still have an important role in the local farming economy and society. There have been changes in the crops grown in the area, including a transition from hemp to increasingly specialized and intensive industrial monocultures, resulting in land degradation. One of the vulnerabilities of the area is its exposure to the expansion of large industrial complexes, which is transforming the whole area into a continuous peri-urban landscape. There is, however, a high percentage of organic farms in the area (13% of land).

When are PPPs applied?

Fungicides and insecticides are applied throughout the year, whilst herbicides are applied in Spring.

Which PPPs are relied on the most in the area?

Conventional farmers apply several herbicides (e.g., glyphosate, terbuthylazine, metolachlor, pyrazole), insecticides (e.g., imidacloprid, thiasmethoxam, chlorantaniliprole, and fungicides (metalaxyl, boscalid, azoxystrobin). Organic farmers use insects to control pests, mulching, and composting of organic residues.



Meet the case study leader for Italy: Daniele Mandrioli



Daniele Mandrioli is the Director of the Cesare Maltoni Cancer Research Center of the Ramazzini Institute. He conducts research on environmental toxicants and carcinogens and Evidence Based Toxicology (EBT). His research includes the design and development of bioassays, investigations on the role of aneuploidy in carcinogenesis and reproductive toxicity, the analysis of different chemical regulations, systematic reviews in environmental and occupational health.



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Introducing the SPRINT case studies: Portugal

What type of agriculture is being studied in Portugal?

Viticulture (grapes for wine)

What are the main characteristics of the site?

This case study is located in the Bairrada Region of Portugal. The climate here is Mediterranean with mild, wet winters and warm, dry summers. The average annual rainfall and temperature in the region is 925 mm and 15.7 °C. The dominant land use in this region is for vineyards (≈6500ha). The remaining area is covered by maritime pine plantations, annual rain-fed crops (e.g., corn, potato) and pastures, eucalypt plantations and mixed (pine and eucalypt) forests. Most of the farming systems are small to medium in size with most adopting integrated production with minimum tillage and regulated application of fertilizers and phytosanitary treatments.

When are PPPs applied?

The growing season for vineyards is all year round, but PPPs are typically applied between March-July.

Which PPPs are relied on the most in the area?

Conventional vineyard farmers use several PPPs. The most commonly used in the case study area appear to be glyphosate, cymoxanil, folpet, and azoxystrobin. Organic farmers, meanwhile, apply copper sulphate, sulphur, and mineral oils.



Meet the case study leader for Portugal: Nelson Abrantes

Nelson Abrantes is an Assistant Researcher at the University of Aveiro. He is interested in biomonitoring and has undertaken stream assessment research to study aquatic communities and its integration with ecotoxicological tools. For example, he recently co-authored a paper exploring whether a parasite could adapt to the presence of a fungicide (tebucanazole).



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Introducing the SPRINT case studies: Denmark

What type of agriculture is being studied in Denmark?

Winter wheat and spring barley

What are the main characteristics of the site?

Over half of Danish land is agricultural (61%), with farms on average, spanning 77ha. The main crops grown in Denmark are cereals, 3/4 of which are used to feed livestock, including pigs, cattle, and poultry.

The case study site for SPRINT will be located in the central Denmark region which has fertile soils, forests, lakes, and streams.

When are PPPs applied?

On winter wheat, herbicides are applied in October/December and April/May, whilst fungicides are applied in May/June. On spring barley, herbicides are applied from April-May whilst fungicides are applied in June-July.

Which PPPs are relied on the most in the area?

Glyphosate is the most heavily relied upon pesticide by conventional farmers in Denmark.



Meet the case study leader for Denmark: Trine Nørgaard

Trine Nørgaard is a Postdoctoral scientist in the department of agroecology at Aarhus University. Her research specialises in hydropedology, which is the study of how water is transported in soil columns and the risks of pesticide leaching as this water travels through the soil.



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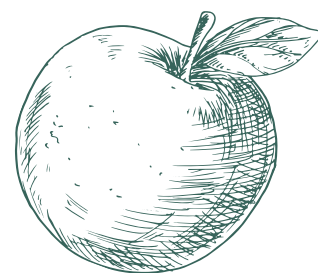
Introducing the SPRINT case studies: Bern, Switzerland

What type of agriculture is being studied in Bern?

Orchards

What are the main characteristics of the site?

The canton of Bern is the largest agricultural canton in Switzerland, with an agricultural area of 191,965 hectares. There are over 10,000 farms in the area, with an average size of 18ha. The landscape is diverse, with farms located in pastures, valleys, hills and mountains. The generous pastures of the Bernese Jura are mainly used for dairy and meat production. A wide range of fruit and vegetables are grown in the Bernese Lakelands. In the Bernese Midlands, there are arable and mixed farms. Milk and cheese production is decisive for value creation throughout the canton, especially in the Bernese Oberland and Emmental. Thanks to the favourable microclimate around the lakes, quality wines are also produced.



When are PPPs applied?

Throughout the year depending on crop requirements.

Which PPPs are relied on the most in the area?

Herbicides: Glyphosate, Bentazone, Terbutylazine, Metolachlor, Pyrazole, Oxadiazon

Fungicides: Metalaxyl, Boscalid, Azoxystrobin

Insecticides: Imidacloprid, Methoxyfenozide, Chlorantraniliprole, Thiamethoxam, Dimethoate



Meet the case study leader for Switzerland: Abdallah Alaoui

Abdallah Alaoui is a Senior Research Scientist in the Centre for Development and Environment at the University of Bern. His research interests include soil management and protection and the evaluation of the impact of land use and climate change on soil and flow processes. He is also involved in another Horizon-2020 project, SoilCare.



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Introducing the SPRINT case studies: Istria, Croatia

What type of agriculture is being studied in Croatia?

Olives

What are the main characteristics of the site?

Most of Istria is agricultural because it is rich in fertile areas. Olives, grapevines, different types of vegetables, and fruits are mostly grown.

When are PPPs applied?

Most applications occur between May-September, and some applications as early as February.

Which PPPs are relied on the most in the area?

Istria has both integrated and organic agricultural production. Integrated production uses PPP, and the most commonly used are glyphosate, copper oxychlorides, deltamethrin, phosmet, and dimethoate. While in organic production, copper oxychlorides and hydroxides, paraffin oil, and *Bacillus thuringiensis* are used.



Meet the case study leader for Croatia: Igor Paskovic

Igor Pasković is a Research Associate and President of the Scientific Council at the Institute of Agriculture and Tourism Poreč (IPTPO), Croatia. He is an agricultural plant scientist with a particular interest in olive plant nutrition. His publications include research on the compatibility of fungicides and mycorrhiza fungi in open-field tomato production and the potential of olive pomace as a soil amendment.



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Introducing the SPRINT case studies: The Netherlands

What type of agriculture is being studied in The Netherlands?

Potatoes

What are the main characteristics of the site?

The study site is located in the North of The Netherlands. The region has an average temperature of 8.5°C and mean annual precipitation of 796 mm. The area is important for agriculture, with more than 50% of the acreage in Groningen under arable farming. The main crops here are potato and cereal crops. Dairy farming also plays an important role, with around 20% of Dutch dairy farms located in the North. The Groningen province government is financially encouraging farmers to adopt more environment friendly farming practices. At Kollumerwaard, the farmers meet once per month and discuss the issues related to present and future of their production and farms.



When are PPPs applied?

April-September

Which PPPs are relied on the most in the area?

Herbicides: Carfentraozonethly, Cyazofamid, Cymoxanil, Glyphosate, Linuron, Metamitron

Fungicides: Azoxystrobin, Bixafen, Cyazofamid, Mancozeb, Propamocarb, Mandipropamid

Insecticides: Cyromazine, Oxamyl



Meet the case study leader for The Netherlands: Paula Harkes

Paula Harkes is a Research Associate at Wageningen University. Her research interests span microbiology, soil ecology and plant-soil interactions. Alongside leading the case study in the Netherlands, Paula is also involved in coordinating the SPRINT project.



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Introducing the SPRINT case studies: Czech Republic

What type of agriculture is being studied in the Czech Republic?

Oil plants

What are the main characteristics of the site?

Around half (54 %) of the total area of the Czech Republic is now farmed, constituting 4.2 million hectares. Most farming here (3 million hectares, 71%) is arable. Hops are also a key crop in the Czech Republic, which is also a large producer of beer. Organic farming has been growing in the Czech Republic since the 1990s and is characterized mainly by the extensive breeding of cattle, goats and sheep in less favourable agricultural areas.

When are PPPs applied?

PPPs are applied several times throughout the year.

Which PPPs are relied on the most in the area?

On conventional farms, several PPPs are used, including:

Herbicides: Glyphosate, Metazachlor, Petoxamid, Clopyralid, Napropamide, Clomazone

Fungicides: Tebuconazole, Thriophanate-methyl, Prochloraz, Metconazole

Insecticides: Chlorpyrifos, Thiacloprid, Cypermethrin, Deltamethrin



Meet the case study leader for the Czech Republic: Jakub Hofman

Jakub Hofman is an Associate Professor at RECETOX (Research Centre for Toxic Compounds in the Environment) at Masaryk University. He is a soil ecotoxicologist and has been cited over 1000 times since 2015.



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Introducing the SPRINT case studies: Argentina

What type of agriculture is being studied in Argentina?

Cereals, oilseeds and vegetables

What are the main characteristics of the case study?

Argentina is one of the world's major exporters of soybeans and wheat, as well as meat (e.g., beef). The Argentinian case study site is located within the Buenos Aires region, which is relatively mild and has an average temperature of 16C and rainfall of 45 inches. Wheat, corn and oilseeds are key crops in the Buenos Aires region.

When are PPPs applied?

All year round depending on the crop.

Which PPPs are relied on the most in the area?

Both conventional and organic farms use several crop protection products in Argentina.

The PPPs used on conventional farms include:

Herbicides: Acetoclor, Atrazine, Diclosulam, Flurocliridona, Glyphosate, Imazapic, Imazapir

Insecticides: Clorpirifos, Aletrina, Carbaril, Carbofuram, Imidacloprid, Fipronil

Fungicides: Epoxiconazol, Kresoxim metil, Metalaxil, Metconazo, Tebuconazol, Triticonazol.



Meet the case study leader for Argentina: Virginia Carolina Aparicio

Virginia Carolina Aparicio is an Agricultural Engineer working at the Balcarce research centre within the National Institute of Agricultural Technology. Her research interests include soil physics, soil salinity, and pesticides. She has almost 800 citations and 75 research items.



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SPRINT PUBLICATIONS

Two open access papers have now been published by SPRINT. The corresponding author for both papers is Peter Fantke of the Technical University of Denmark (see biography on px).

Crenna *et al.* (2020) introduce a quantitative framework for assessing pesticide-related exposure and effects on insect pollinators with initial focus on bees in a sustainability assessment context. They undertook a case study on two different pesticides, the insecticide lambda-cyhalothrin and a fungicide, boscalid, on oilseed rape fields. It was found that nectar foragers were the most affected by these pesticides, primarily due to oral exposure.



Environment International
Volume 138, May 2020, 105642



Characterizing honey bee exposure and effects from pesticides for chemical prioritization and life cycle assessment

Eleonora Crenna ^{a,1}, Olivier Jolliet ^b, Elena Collina ^a, Serenella Sala ^c, Peter Fantke ^d

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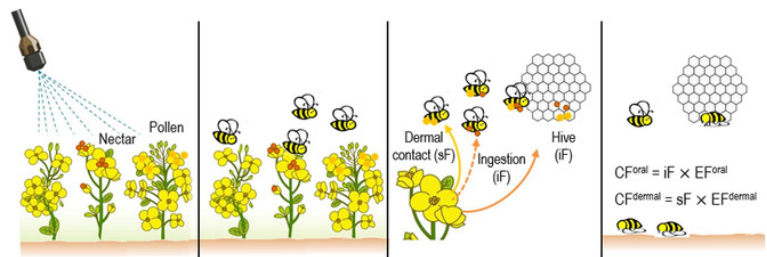
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<https://doi.org/10.1016/j.envint.2020.105642>

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Journal of Cleaner Production
Volume 277, 20 December 2020, 124099



Coupling pesticide emission and toxicity characterization models for LCA: Application to open-field tomato production in Martinique

Céline Gentil ^{a,b,c} , Claudine Basset-Mens ^{a,c,d} , Sarah Manteaux ^{a,b,e} , Charles Mottes ^{a,b} , Emmanuel Maillard ^{a,f} , Yannick Biard ^{a,c,d} , Peter Fantke ^g

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Gentil *et al.* (2020) coupled quantitative models for estimating pesticide emissions and residues in food crops including subsequent human exposure and health impacts in a sustainability assessment context. These models were tested on tomatoes in Martinique (in the French West Indies). It was found that the consumption of tomatoes is the main mechanism by which humans are exposed to pesticide residues from these crops.



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SPRINT IN THE NEWS

A press release to celebrate the launch of SPRINT was published in early October. This resulted in several news articles in countries including the UK, Ireland, The Netherlands, Spain, and Argentina. We have also had video and radio interviews in Cartagena and the Netherlands with some of our project partners and our project coordinator, Violette Geissen. Lastly, our first blog article introducing the 'what, why and how' of PPPs is now live on the SPRINT website.

Please click on the photos of each news item to access the full pieces.



Hoogleraar Violette Geissen gaat aantonen dat er met pesticiden écht veel mis is: 'It's time for change'

WAGENINGEN – Toelatingstesten voor pesticiden zijn achterhaald, zegt prof. dr. Violette Geissen. De systematiek is verouderd en fabrikanten kunnen testen in voor hun gunstige omstandigheden. Veel reële risico's worden daardoor niet getoetst, voordat pesticiden op de markt komen.

08 de octubre de 2020 / NOTICIA

Transición hacia la protección sostenible de las plantas en la agricultura: presentación del proyecto SPRINT

El uso de plaguicidas representa un riesgo para la salud humana y ambiental. Los hallazgos de investigaciones recientes sugieren una asociación entre la exposición a los plaguicidas y un mayor riesgo de problemas de salud.



LOOKOUT. Europe connection

Teresa Allepuz presents the SPRINT project in which the UPCT participates with the direction of Josefina Contreras. They study the pesticides and supplements that plants may need to promote sustainability



Accelerating the transition towards sustainable pest control in agriculture: introducing the SPRINT project

The SPRINT project
Sep 21 - 2 min read

Study to probe link between pesticides and our physical and mental well-being

Project to break new ground in understanding how pesticides may affect physical and mental well-being of humans and animals who consume them



Farming systems in Europe rely strongly on the use of pesticides. Pictures: iStock

de Volkskrant

Work Background Columns & Options Recent Science People The guide Culture & Media Plans Be

INTERVIEW PROFESSOR VIOLETTE GEISSEN
What does agricultural poisons do to our health? 'Many questions have never been investigated'



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SPRINT project leaflets and recruitment brochures

A project leaflet for the SPRINT project is currently being finalised and printed. A copy of this leaflet will be available on the website as a downloadable PDF shortly. We have also produced resources to help our case study site leaders to recruit participants, including an introductory leaflet and a more detailed brochure.



Launching SPRINT social media

Upon the launch of SPRINT at the start of September, several social media accounts were set up to make sure we have an online presence. These platforms include Twitter, Facebook, LinkedIn, YouTube, Instagram, and Medium.

You can follow our progress and keep up-to-date with the latest pesticide research by following our social media accounts.

Connect with us:



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OTHER PESTICIDE NEWS

Pesticide news

- Mugwort may offer a sustainable alternative to mancozeb (which is being withdrawn by the EU from next year) for controlling late blight in potatoes.
- A Danish study has found that loosening wheel tracks may lessen the risk of pesticides leaching to surface waters.

Noteworthy publications

Patel *et al.* (2020) Night time Application of UV-C to Control Cucumber Powdery Mildew. *Plant Health Progress*, **21**, 40-46. (see a news article about the implications of the paper for viticulture [here](#)).

Whelan *et al.* (2020) A new conceptual model of pesticide transfers from agricultural land to surface waters with a specific focus on Metaldehyde. *Environmental Science-Processes & Impacts*, **22**, 956-972.

Wintermantel *et al.* (2020) Neonicotinoid-induced mortality risk for bees foraging on oilseed rape nectar persists despite EU moratorium. *Science of the Total Environment*, **704**.

Xu *et al.* (2020) Association between pyrethroid pesticide exposure and hearing loss in adolescents. *Environmental Research*, **187**.

SPRINT job opportunities

We have a few exciting job opportunities which will be announced very soon, including a full-funded PhD position. Please check the [project website](#) regularly if you'd like to be kept informed about opportunities to work with us!



PROJECT PARTNERS

Wageningen University (NL)
Land Quality Management Ltd (UK)
Universitaet Bern (CH)
Aarhus Universitet (DK)
Stichting Katholieke Universiteit (NL)
Fundacio Institut D'investigacio Sanitaria Pere Virgili (Iispv) (ES)
Cooperativa Sociale Istituto Nazionale per lo Studio E Il Controllo dei Tumori E Delle
Malattie Ambientali Bernardino Ramazzini (IT)
Universidade de Aveiro (PT)
Universiteit Utrecht (NL)
Forschungsinstitut Fur Biologischen Landbau Stiftung (CH)
Danmarks Tekniske Universitet (DK)
Ecologic Institut Gemeinnützige Gmbh (DE)
Countryside and Community Research Institute, University of Gloucestershire (UK)
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