

Final Conference COST ACTION 21134 TOP-AGRI network

Conference Summary

The final conference of COST Action CA21134 Towards zero Pesticide Agriculture: European Network for Sustainability (TOP-AGRI-Network) was held from 9–11 June 2026 at the Julius Kühn Institute (JKI) in Berlin, Germany. The meeting presented scientific results generated within the Action and brought together research on biological approaches to crop protection, cropping-system diversification and the socio-economic conditions for reducing pesticide dependence.

The programme comprised three thematic sessions, an invited key note introducing the topic of each session, scientific presentations and poster contributions by young researchers. In total, three invited lectures, 15 short presentations and 29 posters were presented. A field visit to the JKI long-term experiments at the JKI experimental station in Dahnendorf complemented the scientific programme and provided an opportunity to discuss experimental results in relation to agricultural practice.

Sessions

Breakthroughs in biology, with possible consequences on crop protection

The first session addressed biological mechanisms and resources that may contribute to reducing the use of chemical synthetic pesticides in crop protection. The keynote on advances in microbiome research was complemented by studies on plant–microorganism interactions, plant immunity and disease development. Other contributions examined biopesticides, natural compounds and their effects on crop quality and plant health. Research presented in the poster session included microorganisms, plant-derived compounds and improved formulations of natural substances. Genetic resources for disease resistance and, liquid mulch formulations and the allelopathic potential of crops for weed management were discussed.

Future cropping systems based upon active prophylaxis

The second session focused on preventive crop protection within diversified cropping systems. The keynote addressed experimental and statistical challenges associated with research on diversified systems. Contributions covered the transfer of experimental approaches into diversified cropping systems and covered varietal mixtures, beneficial microorganisms, trap cropping, intercropping and the use of service crops. Several studies considered the simultaneous effects of these practices on pest regulation and other ecosystem functions, including support for pollinating insects. Field results from pesticide-free cropping systems and long-term experiments provided evidence on yield performance and the practical implications of reducing or eliminating synthetic plant protection products, as well as long-term field experiments.

The presentations and posters illustrated that active prophylaxis can involve several complementary measures rather than a single replacement for chemical control. The potential of these approaches to contribute to pest regulation while providing additional agronomic or ecological benefits was illustrated. At the same time, results obtained under field conditions were strongly affected by management factors and the variability of field conditions. The complexity of diversified systems requires experimental designs and statistical approaches suited to long-term, multi-factor cropping-system research.

Unlocking the sociosystems to foster transition and transformation

The third session considered the conditions influencing changes in agricultural practice. The keynote examined transition and transformation in established crop-protection systems from an international

perspective. Further contributions addressed the mapping of research and innovation relevant to zero-pesticide cropping systems, barriers to transition identified through multi-actor approaches, and the development of tools for monitoring and assessing pesticide risks. Stakeholder studies from Germany and Serbia examined farmers' perceptions and constraints affecting the adoption of pesticide-free and non-chemical weed-management practices. Additional contributions addressed the requirements for changing established farming practices such as agroecological transition pathways, considering the landscape complexity, consumer responses to pesticide-free labels and socio-economic and institutional constraints.

Lessons learned

The contributions across the three sessions indicated that individual alternatives to pesticides are unlikely to achieve substantial reductions in pesticide dependence when considered in isolation. Greater emphasis is required on preventive measures that reduce pest development, interrupt pest cycles or strengthen natural regulation. Such measures need to be combined into cropping systems according to local production conditions and the biology of the relevant pests, diseases and weeds.

The research presented on diversified cropping systems showed that approaches developed under controlled or experimental conditions can be transferred to field-scale production, but their performance is often site- and context-dependent. This creates a need for longer-term field research and methodological approaches that adequately capture interactions among crops, pests, management practices and environmental conditions.

The discussions on socio-economic performance of cropping systems further indicated that changes in pesticide use require adjustments beyond the farm level. Farmers need access to appropriate knowledge, practical support and suitable conditions for implementing alternative practices. Markets, research, institutions and policy therefore influence the feasibility of changes in farm management.

Summary

The conference brought together complementary perspectives on the reduction of pesticide use, ranging from biological research and alternative control measures, to diversified cropping system experiments and socio-economic studies on the changes in agricultural practice. The results indicate considerable potential for preventive and non-chemical approaches, while also showing that substantial pesticide reduction requires more than the development of individual alternatives. Preventive measures and diversified cropping practices need to be combined in suitable crop production strategies and supported by changes in knowledge, institutional and market conditions. Additionally, their effectiveness depends on their integration into locally adapted cropping systems.

A central conclusion was that reducing pesticide dependence and the transition towards pesticide-free agriculture require changes in the design and management of cropping systems rather than the replacement of individual pesticide products by individual alternatives together with enabling conditions beyond the farm. Further research is needed to improve the reliability of preventive measures and biological approaches, assess their performance under field conditions and support their integration into practical crop-protection strategies in different agricultural contexts.

A Book of Abstracts (<https://doi.org/10.5073/20261014-092648-0>) was prepared, documenting the scientific contributions presented by members of the network.



Final Conference

COST Action TOP-AGRI network

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Inter-Network Workshop of

the Agroecological Crop Protection Initiative (ACPI)

and

the Agroecological Partnership (AEP)

&

European Research Alliance (ERA)

Event hosted at:
Julius Kühn-Institut,
Königin-Luise-Straße 19, 14195 Berlin, Germany
8-12 June, 2026

Program Overview

Day 1 | Monday - 08.06.26 | ACPI & AEP Inter-Network Workshop

12:30 – 14:00 **Welcome & Registration**

14:00 – 17:30 **ACPI & AEP Inter-Network Workshop**

Session 1- Introductions of the participating networks

Day 2 | Tuesday - 09.06.26 | ACPI & AEP Inter-Network Workshop | ERA General Assembly

08:30 – 09:00 **Registration**

09:00 – 12:30 **ACPI & AEP Inter-Network Workshop**

Session 2- Identification of objectives and expectations

European Research Alliance "Towards chemical pesticide-free agriculture"

General Assembly

ERA members only

12:30 – 13:30 *Lunch Break*

13:30 – 14:00 **Opening of COST T0P-AGRI Final Conference**

14:00 – 17:30 **COST T0P-AGRI Final Conference - Session 1**

Breakthroughs in biology, with possible consequences on crop protection

17:30 – 19:00 **ACPI Student Award Ceremony 2026**

20:00 – 22:00 **Social Dinner**

Restaurant Renger Patzsch, Wartburgstraße 54, 10823 Berlin

Day 3 | Wednesday - 10.06.26 | COST T0P-AGRI Final Conference

08:30 – 11:00 **COST T0P-AGRI Final Conference - Session 2**

Future cropping systems based upon active prophylaxis

11:30 – 12:30 *Lunch Break*

12:45 **Departure to Field Visit**

14:00 – 18:00 Field visit – JKI Long-Term experiment

Day 4 | Thursday - 11.06.26 | COST T0P-AGRI Final Conference

09:00 – 12:30 **COST T0P-AGRI Final Conference - Session 3**

Unlocking the sociosystems to foster transition and transformation

12:30 – 13:00 **COST T0P-AGRI Final Conference - Conference summary**

13:00 – 13:45 *Lunch Break*

13:45 – 18:00 **ACPI & AEP Inter-Network Workshop - Session 3**

Defining strategies of future research projects

Day 5 | Friday - 12.06.26 | ACPI & AEP Inter-Network Workshop

09:00 – 12:30 **ACPI & AEP Inter-Network Workshop - Session 4**

Prototyping of research projects

12:30-13:00 **Closing of ACPI & AEP Inter-Network Workshop**



Final Conference - Program

Tuesday, 09.06.2026

13:30 – 14:00	Opening Final COST Conference
Session 1: Breakthroughs in biology, with possible consequences on crop protection <i>Moderator: Riccardo Bommarco</i>	
14:00 – 14:30	Keynote Corinne Vacher <i>Advances in</i> microbiome understanding and its use in crop protection
14:30 – 15:30	Comparative Effects of Chemical and Biopesticide Applications on Fruit Quality and Bioactive Compounds in Strawberry (<i>Fragaria ananassa</i> Duch.) (Salih Kafkas)
	In silico Prediction of Effector-Driven Infection Strategies in Monilinia Using Dual RNA-seq (Nadir Keresteci)
	Engineering fatty acid metabolism through gene overexpression to strengthen tomato immunity against root-knot nematodes (Mostafa Karam)
15:30 – 16:00	Coffee Break
16:00 – 16:30	<i>Digital Poster Pitches – Session 1</i>
16:30 – 17:30	Allelopathic potential of wheat: a physiological mechanism with agronomical impacts (Lorenzo Negri)
	Rethinking Plant Disease Management Through Keystone Species in the Peach Fruit Mycobiome (Hilal Ozkilinc)
	Human interference induces changes in reproductive behaviour in cultivated crops (Ally Haari)

Digital Poster Pitches Session 1 16:00-16:30

Nr.	Speaker	Title
1	Suhartini Wildan	Integration of Leaf By-Products and <i>Spirulina Platensis</i> as Biofertilizers and Plant-Based Biopesticides
2	Serim Ahmet Tansel	Sprayable Alginate-Reinforced Keratin-Based Liquid Mulches for Effective Physical Weed Suppression
3	Ozaktan Hatice	The potential of lactic acid bacteria in mediating the control of bacterial canker and plant growth stimulation in tomato plants
4	Goduc Sahan Firdevs	Toxicity and non-target effects of tea tree and orange essential oils against <i>Tuta absoluta</i>
5	Bighignoli Bruno	Why not combine intercropping and beneficial fungi to control Fusarium head blight on wheat? A Review Identifying Practical Applications and Knowledge Gaps
6	Bourenane El Khansa	Nanotechnology for Sustainable Crop Protection: Nanoencapsulation of <i>Lavandula dentata</i> Essential Oil Against Aphids
7	Mucaj Buist	Breeding resistant apple cultivars against fungal diseases
8	Sevcov Martin	Effect of an organic pesticide on plant physiological parameters
9	Pfeifer Matthias	Investigation of Disease Resistance in <i>Malus baccata</i> , Jackii'
10	Djukanovic Mitar	Ladybirds (Coleoptera: <i>Coccinellidae</i>) as predators of Aleurocanthus spiniferus (<i>Quaintance</i>) on the coast of Montenegro
11	Bajus Marko	Mitigation of drought-induced stress in maize (<i>Zea mays L.</i>) through application of <i>Papiliotrema laurentii</i>
12	Özsari Pinar , Ozaktan Hatice	The Role of Endophytic Bacteria in Pesticide-Free Control: The Example of <i>Spodoptera littoralis</i> (Boisduval) (Lepidoptera: Noctuidae)
13	Vesna Tunguz	The influence of harvest residues in the sustainable management of cultivated areas
14	Varlam Aplakov	Sustainable Protection of the Georgian Grape Variety Saperavi: Clonal Selection and Biocontrol

Wednesday, 10.06.2026

Session 2: Future cropping systems based upon active prophylaxis		<i>Moderator: Christian Huyghe</i>
08:30 – 09:00	Keynote Kathrin Grahmann Research on diversified cropping systems for pesticide reduction: Experimental challenges and statistical solutions	
09:00 – 10:00	Varietal Mixture design, Step 1: Preliminary integration of Genetic Diversity and Beneficial Microorganisms in Chickpea defense against Fusarium Wilt (<i>Anna Rizzolo</i>)	
	Semiochemically assisted trap cropping to reduce broad bean beetle (<i>Bruchus rufimanus</i>) infestation in faba bean (<i>Chloé Raderschall</i>)	
	The role of intercropping for aphid control in wheat and the additional support to pollinating insects provided by legume crops (<i>Musa Sürücü</i>)	
10:00 – 11:00	Yield Potential of Cropping Systems without Chemical Synthetic Plant Protection Products in NOcsPS field trials in Germany (<i>Beate Zimmermann</i>)	
	Rethinking insect pest management in agriculture (<i>Ute Fricke</i>)	
	Active prophylaxis through intercropping and elicitor application in a medicinal plant cropping system (<i>Marie Hielscher</i>)	
11:00 – 11:30	<i>Digital Poster Pitches – Session 2</i>	
11:30 – 12:30	Lunch break	
14:00	Field visit – JKI Long-Term experiments	

Digital Poster Pitches - Session 2 (11:00-11:30)

Nr.	Speaker	Title
1	Torres Agama Ayse	Harnessing Entomopathogenic Fungi for Preventive Pest Management in Next-Generation Cropping Systems
2	Burt Megan	Interactions of the fungal pathogen <i>Ramularia collo-cygni</i> with different cereals
3	Chandel Ashu	A Multi-Zonal Statistical Comparison of Natural and Chemical Farming: Evidence from Farm-Level Economic Indicators in the Indian Himalayas
4	Emilia Koch	Change of some cropping systems in a long-term trial comparing different systems: rationale and implications for statistical analysis
5	Yavuz Seckin Reyhan	Cultivating and Utilizing Crop Mixtures to Support Sustainable Food Systems
6	Biljana Jordanoska Shishkoska	Field Evaluation of Neem (<i>Azadirachta indica</i>) for Sustainable Aphid Management in Tobacco production
7	Kola Amedeo	Glycyrrhiza glabra Leaf Extract as a Plant-Derived Product for Reducing Fungal Diseases and Copper Inputs in Apple and Pomegranate
8	El Meziane Aya	Improved Monitoring of <i>Rhagoletis spp.</i> in Cherry Orchards Using Visual Traps and Ammonium-Based Lures
9	Lundin Ola	Intercropping service crops for multifunctional crop protection against insects
10	Selin Gündüz	Legume-Based Preventive Crop Protection: How Chickpea Breeding and Agroecological Practices Reduce Pesticide Dependence

Thursday, 11.06.2026

Session 3:		<i>Moderation: Mugur Jitea</i>
Unlocking the sociosystems to foster transition and transformation		
09:00 – 09:30	Keynote Paul Thomassin Transition and transformation of locked-in crop protection design. What do we learn from experiences all over the world?	
09:30 – 10:30	Mapping research, solutions and innovations for supporting the transition toward zero-pesticides use in European cropping systems (<i>Federico Leoni</i>)	
	Barriers and Requirements for the Transition to Pesticide-Free Agriculture: Insights from a Multi-Actor Innovation Systems Approach (<i>Iulia-Sorina Dan</i>)	
	Development of an IPM monitoring tool with an integrated harmonized pesticide risk assessment for the EU (<i>Vera Krause</i>)	
10:30 – 11:00	Coffee Break	
11:00 – 11:30	<i>Digital Poster Pitches – Session 3</i>	
11:30 – 12:30	Drivers and barriers to the establishment of pesticide-free farming systems: a qualitative analysis of stakeholder perceptions in Germany (<i>Jordan Gunnar</i>)	
	Unlocking Barriers to the Adoption of Non-Chemical Weed Management Strategies: Insights from Serbian Farmers (<i>Dragana Božić</i>)	
	Circular economy: alleviating biotic and abiotic stress in crops by using plant biostimulants (<i>Giuliano Blancato</i>)	
12:30 – 13:00	Conference summary	<i>Renata Bažok</i>

Digital Poster Pitches- Session 3 - 11:00-11:30

Nr.	Speaker	Title
1	Moran-Rodas Virna	Characterization of agroecological transitions using the indicator-based methodologies TAPE and IPPTA: Evidence from Nariño, Colombia
2	Villa Villegas Manuela	Local and landscape complexity support plant and spiders in Italian olive groves
3	Oludoye Oluseye	Mapping Transition Pathways toward Pesticide-Free Farming: Evidence from Cocoa and Vegetable Systems in Southwestern Nigeria
4	Zimmermann Beate	Pesticide Free Cropping Systems, Insights from Germany
5	Vera Angele	Evaluating Pesticide-Free Labels: An Eye-Tracking Study of Visual Attention and Product Acceptance
6	Sarah Redlich	Bioblitzes in agroecosystems across Europe - A tool to favor biodiversity conservation by gathering farmers, scientists and general public
7	Sharma Varnika	Socio-Economic Constraints and Institutional Barriers in Natural Farming Adoption: Evidence from Garrett Ranking and Chi-Square Analysis in the Indian Himalayas