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Book of Abstracts

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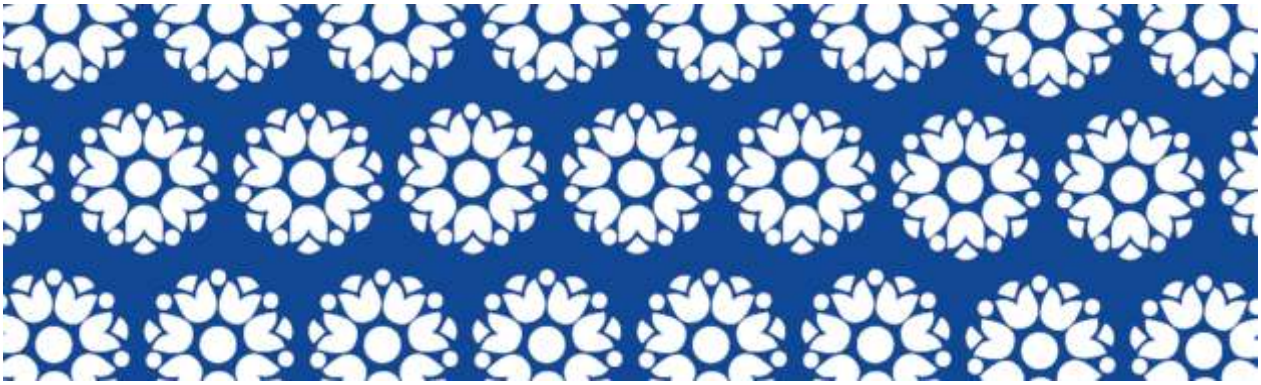
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TRACK

Agriculture

Sustainable Agriculture - The Art and Science of Growing Food

28 abstracts · 9 oral presentations · 19 posters

ORAL Agriculture · UHOH - University of Hohenheim, Deutschland · ID 128

Beyond the Regenerative Promise: An Integrated Evaluation of Soil Health, Greenhouse Gas Emissions and Nutritional Outcomes in Tropical Mung Bean Production

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Tropical agricultural systems face multiple interconnected challenges, including soil degradation, climate change and nutritional security. In recent years, regenerative agriculture has emerged as concept aiming to improve ecosystem functioning and agricultural productivity simultaneously. However, multi-dimensional studies supporting these claimed, at times promised, outcomes remain limited, particularly for tropical crops such as mung bean. This restricts the development of evidence-based recommendations for regenerative agriculture in these contexts.

This study quantified the effects of no-till management, organic fertilization and cover cropping, individually and in combination, on soil health, greenhouse gas emissions as well as the productivity and nutritional quality of mung bean. It further aimed to identify practice combinations effective in improving multiple outcomes and explore potential trade-offs among the assessed outcome dimensions. For this, a field experiment was conducted in tropical Southern Taiwan.

After one season, regenerative practices primarily affected soil biological indicators, with limited responses of soil physiochemical properties. No-till management increased root colonization by arbuscular mycorrhizal fungi, whereas organic fertilization increased bacterial alpha diversity. Organic fertilization reduced N2O emissions but increased CO2 emissions, resulting in no apparent climate mitigation benefit within the measurement period. For mung bean, regenerative practices did not result in a yield penalty. Seed nutrient concentrations appeared to have been influenced more strongly by environmental constraints at the study site than the management practices.

The varying responses among the assessed outcome dimensions demonstrated that no practice combination simultaneously improved all assessed outcomes. Instead, the suitability of a regenerative practice depended on the specific outcomes prioritized and environmental conditions. This study concludes that, rather than a universally beneficial solution for tropical agricultural systems, regenerative agriculture should be understood as a flexible framework, which requires evidence-based selection and context-specific adaptation of practices.

ORAL Agriculture · SGGW - Warsaw University of Life Sciences, Poland · ID 344

Effects of zinc oxide nanoparticles on soil bacteria, nitrogen cycle, and plant growth

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Zinc oxide nanoparticles (ZnO NPs) are among the most widely produced engineered nanomaterials, used in cosmetics, sunscreens, antibacterial coatings, and agricultural products. Their increasing presence in the environment raises concerns about potential toxic effects on soil microbiota and plants, both of which play a crucial role in ecosystem functioning and food production. The aim of this study was to assess the potential toxicity of ZnO NPs toward soil bacteria and two agriculturally important plant species — soy and wheat — with particular focus on nitrifying bacteria, diazotrophs, and biofilm-forming communities. Bacterial toxicity was evaluated using minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC), alongside viability tests. Results demonstrated a clear dose-dependent relationship: higher ZnO NP concentrations led to greater inhibition of bacterial growth and increased cell mortality. Transmission electron microscopy confirmed direct physical damage to bacterial cell membranes. Three-dimensional confocal laser scanning microscopy revealed that increasing nanoparticle concentrations significantly reduced biofilm biomass and structural integrity. Both phase I and phase II nitrification activity were impaired, and total bacterial counts alongside diazotroph populations declined with increasing nanoparticle concentrations. Soil enzyme activity measurements are currently underway. Plant growth experiments showed that ZnO NP exposure adversely affected soy and wheat development, likely as a consequence of disrupted soil microbial communities and impaired nutrient availability. These findings suggest that ZnO NPs pose a possible risk to both soil bacteria and crops, highlighting the need for stricter environmental regulation of nanoparticle release into agricultural soils.

ORAL Agriculture · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 102

Evaluating Carbon Stabilization Mechanisms in Cacao Production Systems: A Global Synthesis and Isotopic Framework for Ecuador

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Agroforestry systems (AFS) are widely recognized for their greater carbon sequestration potential compared to monocultures; however, the extent to which this carbon is stabilized and retained over the long term, as well as the factors controlling its persistence, remains poorly understood. This study combines a global literature synthesis on carbon stocks in tropical cacao production systems with a field-validation framework to be implemented in the Coastal and Amazon regions of Ecuador. The research will evaluate two cacao production systems, monocultures and agroforestry systems (AFS), through the analysis of soil organic matter fractions (POM–mOM), stable isotopes ($\delta^{13}C$), remote sensing-derived vegetation indices (NDVI, EVI, and SAVI), edaphoclimatic variables, and agricultural management practices. Soil organic carbon (SOC) stocks and stable mineral-associated organic matter (mOM) will be quantified throughout soil profiles, while isotopic signatures will be used to trace the contributions of C_3 and C_4 vegetation to carbon inputs.

Preliminary global synthesis indicates that, although some high-density monocultures may exhibit elevated aboveground cacao biomass, agroforestry systems consistently store greater amounts of total carbon. Values of up to 101.39 Mg C ha^{-1} in Ghana and 113.00 Mg C ha^{-1} in Bolivia have been reported, largely driven by shade-tree canopies and increased deep-root turnover. Furthermore, $\delta^{13}C$ isotopic evidence suggests that AFS accelerate the replacement of residual pasture-derived carbon with more stable, forest-like plant carbon. In Ecuador's Amazon region, Chakra systems demonstrate remarkable carbon storage capacity, reaching up to 97.80 Mg C ha^{-1} and recovering nearly 42% of the carbon stocks observed in secondary forests (233.00 Mg C ha^{-1}). Based on these findings, the field phase will investigate carbon stabilization mechanisms in Ecuadorian cacao systems. Field data will support predictive models integrating soil, vegetation, management, and remote-sensing variables to identify and map areas with the highest potential for long-term carbon sequestration and stabilization.

ORAL Agriculture · UNITUS - University of Tuscia, Italy · ID 340

Valorization of stabilized shrimp residues as organic soil improvers: effects on tomato growth and plant–soil–microbiome interactions

Cardarelli, Lucrezia Anastasia Ortelli, Daniel Savatin

In recent years, the valorization of organic waste as agricultural soil improvers has emerged as a key strategy to support the transition towards circular and low-impact farming systems. Among available by-products, shellfish residues represent a particularly promising resource because of their high content of bioactive compounds, especially chitin and chitosan. These natural polymers may exert a dual function in plants: they act as biostimulants, promoting root growth, nutrient-use efficiency and stress tolerance[1], and as elicitors able to activate immune signalling and enhance endogenous crop resistance[2].

Based on these premises, this study assessed the agronomic and physiological effects of solid residues obtained from shrimp heads and shells and stabilized by using a mechanical compactor operating at 90 °C, with a 70–90% reduction in volume. A two-factor greenhouse pot experiment was conducted using tomato (Solanum lycopersicum L.; hybrid F1 Pralyna; SAIS Sementi, Cesena, Italy) plants. The shrimp-derived matrix was incorporated into agricultural soil at three rates, 0, 0.25 and 0.5% (w/v), under both fertilized and unfertilized conditions. Fertilization was supplied as a mineral NPK solution (20-8.8-16; 1 g L^{-1}).

Preliminary results indicated a concentration-dependent improvement in plant growth, biomass accumulation and root system development. Positive trends were observed in both fertilized and unfertilized treatments, suggesting that the amendment may act either synergistically with mineral nutrition or as a partial functional substitute under reduced-input conditions. Physiological, spectrometric and biochemical parameters were monitored throughout the trial, generating an integrated dataset to explore plant–soil–microbiome interactions and metabolic responses associated with shrimp-residue application.

Overall, the results support the potential of mechanically stabilized shrimp residues as multifunctional soil amendments capable of enhancing tomato development while contributing to the valorization of an abundant organic by-product. This work provides a solid basis for future studies on crop resilience, plant priming, and sustainable integration into circular agricultural systems.

ORAL Agriculture · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 61

Beyond Income: Cost-Saving Livelihoods and Women's Empowerment in Black Soldier Fly Farming, Evidence from Zambia

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Women are the main contributors to agricultural production in Zambia, yet persistent gender inequalities limit their access to resources, decision-making, and income opportunities. Black Soldier Fly (BSF) farming has emerged as a sustainable innovation to address the persistent high prices for animal feed and fertilisers, but its benefits for women's empowerment remain underexplored. This study, therefore, examines the potential of small-scale BSF farming for women's empowerment in Zambia through Kabeer's lenses (resources, agency, achievements). Data were collected through semi-structured interviews during on-site visits at all five existing BSF farms with owners and farm workers (in total, n=7), and with six key informants involved in BSF farming in Lusaka and Central Province. Thematic analysis revealed three themes shaping women's empowerment in BSF farming: (i) access to BSF resources, (ii) socio-cultural and gender constraints, both identified as constraining, and (iii) economic viability and livelihood improvements, as a supporting theme. Findings indicate that from the economic perspective, BSF farming mainly supports women through cost savings on animal feed and fertiliser, rather than through stable income from the sale of BSFL-derived feed. While women gained access to skills, community recognition, and decision-making, their empowerment was constrained by inadequate training, limited access to capital and equipment, weak market access, and restrictive gender norms. These constraints challenge policies that treat economic engagement alone as sufficient for empowerment. Overall, BSF farming offers conditional opportunities for women's empowerment. To reach the full potential, it requires coordinated institutional support, improved access to training and capital, and efforts to address gender barriers within the BSF value chain.

ORAL Agriculture · NMBU - Norwegian University of Life Sciences · ID 86

Investigating dynamics and leverage points of Bambara groundnut seed systems in Singida, Tanzania to improve seed security outcomes

Eilif Ronning
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Ecological resilience plays a central role in food systems resilience, and agrobiodiversity can often (though not always) bolster resilience by supporting the principles of diversity and redundancy (Bravo-Peña & Yoder, 2024, p. 10; Folke, 2006, p. 258). In the past, value chain approaches to research and intervention resulted in siloed and reductive problem-solving (Subedi et al., 2025, pp. 1-2). There is a need to understand which conditions foster farmers' management of agrobiodiversity and which circumstances hinder it (Bellon et al., 2018, p. 8). Bambara groundnut (Vigna subterranea) is classified as an 'underutilised' crop, and researchers posit it may bolster food systems resilience as well as food security due to its drought tolerance (Jideani & Jideani, 2021, p. 2; Karl et al., 2024; Mayes et al., 2019, pp. 814-815). Following Donella Meadows, this study took a systems approach to 'zoom in' and zoom out' to investigate the dynamics of Bambara seed systems in Singida, Tanzania. At the macro-level, a system map (systemigram) was created from a literature review and vetted through 24 semi-structured interviews to explore how select food systems drivers in Tanzania shape the bambara production. At the micro-level, 115 farmer surveys were collected to understand how farmers source bambara seeds and their seed security. The study resulted in the identification of systems-informed leverage points for improving Bambara groundnut seed security outcomes. Overall, the study seeks to demonstrate how multi-scalar systems-informed research approaches may contribute to strengthening underutilised crop value chains and expanding our understanding of in-situ conservation of agrobiodiversity.

ORAL Agriculture · L'Institut Agro, France · ID 288

From crowdsourced field observations to regional scale vine water status monitoring: a deep learning approach.

Thomas Juillac

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Monitoring vine water status is critical for adapting agricultural practices to actual field conditions, in particular in the context of climate change. The monitoring of vine shoot growth provides a simple and rapid assessment of vine water stress at field scale. This assessment facilitates the collection of large volumes of crowdsourced observations distributed across space and time, paving the way for regional-scale mapping. However, these data suffer from strong spatiotemporal sampling biases. In ecology, this limitation is widely encountered and deep learning has proven particularly effective for extracting relevant information without prior distribution.

However, applying such methods to agricultural crowdsourced observations raises specific challenges. In agriculture, the target variable is dynamic (i.e. water status), whereas in ecology it is generally static (i.e. species' range). Furthermore, the relationships between this variable and the environmental covariates also change over time in agriculture, unlike in ecology. This study develops a deep learning-based approach taking into account these characteristics while correcting spatiotemporal sampling biases in crowdsourced vine water status observations.

The Apex-Vigne project, a crowdsourcing project of shoot growth observation (7 years; 25 000+ observations) was used as a case study. A multilayer perceptron was trained on several environmental covariates (atmospheric radiation, daily rainfall or available water capacity among others) and on shoot growth observations. Model predicted, on a one-kilometer grid, the probability of belonging to a stress or non-stress class. A point-process loss function, previously used in analogous ecological studies, was adopted to handle the count-like nature of crowdsourced data. Prediction uncertainty was estimated via Monte Carlo Dropout. Weekly outputs of stress probability and associated uncertainty were interpolated spatially to produce regional maps of vine water status. Model was evaluated and compared against classical interpolation approaches.

ORAL Agriculture · WUR - Wageningen University & Research, Nederlands · ID 187

The effect of plant species-specific root exudation on soil microbial biomass and activity under nitrogen deficiency

Inge Knoester

Wageningen University & Research

Conventional agricultural practices have caused widespread habitat loss, soil degradation, nutrient pollution, and biodiversity decline, threatening ecosystem services.

Sustainable organic inputs could mitigate some environmental impacts of conventional agriculture, but their effectiveness depends on microbial nutrient cycling. Gaining a deeper understanding of these processes is vital, especially in the rhizosphere, where many plant-soil interactions occur. Plant-soil interactions, particularly those mediated by root exudates, can influence microbial communities and nutrient mineralization. Yet, species-specific variation in root exudation and its effects under nutrient-limited conditions remain poorly understood.

This study investigated how variation in plant functional traits and root exudation affects soil microbial biomass and activity under nitrogen-limited conditions. A greenhouse pot experiment was conducted using twenty crop species from ten plant families. Measurements included relative growth rate, root and shoot biomass, specific leaf area, root exudate composition, rhizosphere microbial biomass, and extracellular enzyme activity. It was expected that resource-acquisitive species would exude more labile carbon compounds, stimulating microbial biomass and enzyme activity.

Results showed that root-to-shoot ratio at eight weeks was a significant negative predictor for all measured exudates, while plant tissue C:N ratio was positively associated with TOC and phenolics exudation. Root exudates did not significantly predict microbial biomass or most enzyme activities, except for leucine aminopeptidase, which was positively related to phenolics. Furthermore, relative growth rate was positively associated with β-glucosidase activity. These findings indicate that, contrary to the hypothesis, specific plant functional traits influenced root exudation patterns, but increased exudation did not translate into enhanced microbial biomass or activity, suggesting that plant effects on rhizosphere microbial processes under nitrogen limitation may be mediated by mechanisms beyond root exudation alone.

ORAL Agriculture · BOKU University, Austria · ID 111

Sustainable feed, healthier livestock

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Subtitle: Gene editing of soybean protease inhibitors for sustainable local feed production

In Europe, geopolitical and climate pressures are increasing the need for locally produced, sustainable protein sources for animal feed. Soybeans are a key candidate, but their use is limited by protease inhibitors which are antinutritional compounds that reduce protein digestibility and impair growth, especially in monogastric livestock like poultry, swine and fish. These compounds are typically inactivated by heat treatment, an energy-intensive process that can also diminish nutrient quality. This master's project addresses this challenge by applying advanced molecular techniques, specifically CRISPR/Cas gene editing, to reduce protease inhibitor activity in locally adapted soybean varieties, aiming to reduce the need for heat treatment, improve feed quality and decrease reliance on imported protein sources and intensive processing. The study targets five key genes associated with the two principal protease inhibitor families, Kunitz trypsin inhibitors and Bowman–Birk inhibitors, in ten Austrian soybean varieties, of which four were selected for high regeneration capacity. Efficient guide RNAs (gRNAs) were designed and assembled into gene-editing constructs for targeted gene knockout. Agrobacterium-mediated hairy root transformation is employed to validate the functionality of the designed gRNAs. Transformed roots are screened via a RUBY reporter, and target loci are sequenced to confirm editing events. The gene-editing constructs have been successfully assembled and verified, with functional validation underway. This research contributes to the sustainable development of animal feed by providing a foundation for the development of locally produced soybean varieties with reduced antinutritional protease inhibitor activity, thereby improving livestock health and supporting innovation in agricultural biotechnology.

POSTER Agriculture · UHOH - University of Hohenheim, Deutschland · ID 236

Interaction between Spring Barley and Hartmannibacter diazotrophicus Strain E19 under Drought Conditions

Natalia Katsarou

Climate change is increasing the frequency and severity of drought events, affecting cereal production and grain quality. Plant growth-promoting rhizobacteria (PGPR) are suggested as a sustainable approach to improve crop performance under water-deficit conditions Hartmannibacter diazotrophicus strain E19 has been reported to enhance nutrient acquisition and plant productivity. However, its effects on drought responses and grain quality in barley remain poorly understood.

This study investigated the interaction between spring barley (Hordeum vulgare L., cv. RGT Planet) and H. diazotrophicus strain E19 under different drought-stress treatments in a greenhouse experiment. Control and E19-inoculated plants were compared under four water regimes: well-watered conditions, early drought stress, late drought stress, and prolonged drought stress followed by rewatering. Physiological responses were examined through SPAD chlorophyll measurements, proline accumulation, and malondialdehyde (MDA) content. Grain quality was evaluated by determining the nitrogen concentration, total protein content, protein fractions, starch, and amylose concentration.

The results revealed that drought stress and developmental stage influenced physiological responses. SPAD values were significantly affected by drought stress throughout plant development, while proline and MDA concentrations exhibited only minor responses to the drought treatments. Although E19 inoculation did not significantly affect physiological stress indicators, it significantly influenced grain nitrogen content and composition. Inoculated plants reached higher total protein, albumin/globulin, and amylose contents, while significant interactions between inoculation and drought treatment were observed for total protein, hordein, and glutelin accumulation. These effects were most pronounced under late drought stress.

The influence of H. diazotrophicus strain E19 on physiological drought responses was limited, whereas the effects on grain composition and quality-related traits were significant. The changes seen in protein composition and amylose accumulation may affect malting performance and brewing quality, highlighting the potential of E19 as a microbial tool for improving barley grain quality under drought conditions.

POSTER Agriculture · UHOH - University of Hohenheim, Deutschland · ID 378

Plant-Specific Responses to Biostimulant Application in Terrabioponic Vegetable Production

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University of Hohenheim

Biostimulants are increasingly utilized in organic agriculture because they can enhance plant growth, improve nutrient uptake, and increase resilience to environmental stresses. However, their effectiveness is highly dependent on plant species, cultivation practices, and application strategies, making it difficult to establish broadly applicable recommendations. Recent reviews have highlighted the need for plant-specific studies to understand how biostimulants perform under different production systems.

This study investigates the response of a newly developed commercial biostimulant (from Seedforward GmbH) on the growth of lettuce (Lactuca sativa), onion (Allium cepa), and kohlrabi (Brassica oleracea var. gongylodes) cultivated in a terrabioponic system in a greenhouse at the University of Hohenheim (Stuttgart, Germany). The biostimulant was supplied into the water tank and circulated through the irrigation water, delivering it to the root zone, the vermicompost, and back to the water. Four treatments were evaluated: an untreated control, a single 50 mL application, two split applications of 50 mL each, and a single 100 mL application. Plant performance is assessed by measuring both the fresh biomass and the dry biomass of the harvest. Comparing the responses of the three crops across the different application doses allows the evaluation of both species-specific and dose-dependent effects of the biostimulant.

Across the crops evaluated, the single 50mL application consistently resulted in the greatest improvement in plant growth, whereas increasing the application to a single 100mL did not improve growth and generally resulted in lower performance. The split application of 50+50mL performed better than a single 100mL treatment. These findings demonstrate that biostimulant responses are species-dependent and that higher application rates do not necessarily translate into greater plant performance. The study emphasizes the importance of developing crop-specific biostimulant recommendations to enhance efficiency and promote sustainable plant production systems.

POSTER Agriculture · UHOH - University of Hohenheim, Deutschland · ID 243

Climate-Driven Rice Yield Forecasting: Comparing Statistical Models, Machine Learning, Deep Learning, and Transformers

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Rice yield forecasting plays a crucial role in ensuring food security and supporting climate-resilient agricultural planning, particularly in regions highly sensitive to weather variability. This study presents a comparative assessment of multiple modeling paradigms for predicting rice yield across three major rice types, Aus, Boro, and Aman, using long-term (1981–2022) data in the northwestern part of Bangladesh. The dataset incorporates key climatic variables including rainfall, temperature, relative humidity, and wind speed, along with cultivated area and production, from which yield is derived as the target variable. A systematic comparison is conducted across four modeling approaches: classical statistical regression models, machine learning models (Random Forest and XGBoost), deep learning model (LSTM), and Transformer-based architectures designed for sequential climate–yield modeling. Model performance is evaluated using RMSE, MAE, and R^2 across different rice types and districts. Results from similar agricultural time-series studies suggest that machine learning models, particularly XGBoost, typically outperform classical statistical methods due to their ability to capture nonlinear relationships in climate–yield interactions. Transformer-based models are expected to show competitive performance when sufficient temporal structure is present; however, their advantage is limited in small-to-medium tabular datasets such as this, where data volume restricts full exploitation of attention mechanisms. Classical statistical models served as a lower baseline. The study highlights the trade-off between model performance and complexity, providing evident based insights into the applicability of modern machine learning approaches in agricultural field.

POSTER Agriculture · UHOH - University of Hohenheim, Deutschland · ID 265

Towards a cassava ex situ conservation in French Guiana: characterizing cassava varieties and assessing their tolerance to CWBD

Florian Sachsenhofer

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The devastating Cassava Witches' Broom Disease, arrived 2023 in the Americas and is spreading from French Guiana and its bordering regions with Brazil and Suriname. The rich varietal diversity of cassava there, especially in bitter cassava, is endangered, as the growth is inhibited by the disease and healthy stem cuttings are becoming rare, foremost of more susceptible varieties. This study involved the construction of an ex-situ collection of 93 accessions from 28 swiddens in coastal French Guiana, describing their morphological differences, clustering them and examining the differences between these clusters. Much higher varietal differences could be found in the swiddens of Indigenous and Bushinengues (Maroon) farmers compared to other ethnicities, which grow predominantly sweet varieties. These ethnic groups also show significantly longer history in cultivation regarding their varieties. A secondary study on yield across varieties with 96 observations on 12 fields showed higher values for the dominant cluster compared to the cluster containing the majority of sweet varieties and found significantly decreasing dry matter content with higher disease severity. To measure severity a new scale was introduced and tested in a non-destructive allometric yield prediction model, that was developed in the study. Differences in susceptibility between clusters did not prove significant after increasing the sample size, but higher anthocyanin content, however, seems to be a risk trait with higher severity, which has to be explored further. This cluster with predominantly violet colour traits also showed cultural and local confinement, suggesting the need of higher conservation efforts in the West of French Guiana and especially for plants with these traits.

POSTER Agriculture · SLU - Swedish University of Agricultural Sciences · ID 371

Economic and behavioural factors affecting willingness to adopt precision agriculture technologies: Evidence from grain farmers in Spain and Lithuania

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Precision Agriculture Technologies (PATs) are advanced technologies that enable farmers to make timely and informed decisions based on field conditions. This improves productivity, optimises resource use, and reduces the environmental footprint. Yet, adoption of these technologies remains disparate across regions and farming systems. This study investigates the effects of economic and behavioural factors on farmers' willingness to adopt PATs in Spain and Lithuania, two heterogeneous European contexts. To provide a more thorough understanding, the mediating role of behavioural attributes in the relationship between economic factors and adoption intentions is examined. The study utilised survey data collected from 190 commercial grain farmers in the two countries between September 2022 and May 2023. The analyses were based on Expected Utility Theory, Theory of Planned Behaviour, and Technology Acceptance Model. The latent behavioural constructs were derived using Principal Component Analysis. Probit and Tobit regression models were employed to estimate willingness to adopt and adoption intensity, and structural equation modelling was utilised for mediation analysis. Results showed that institutional factors, such as extension services and membership in cooperative and farmer-based organisations, significantly increased the willingness to adopt. Educational attainments also played a crucial role. Among the behavioural determinants, subjective norms, behavioural control, self-efficacy, and advisors' readiness were strong predictors of adoption intentions. Notably, traditionally recognised economic factors, including farm income, farm size, and access to credit, were statistically insignificant. Mediation decomposition yielded further notable results, indicating that behavioural factors considerably offset economic effects, as reflected in a negative indirect economic effect mediated by behavioural components. The study eventually suggests that economic incentives should be complemented by institutional and behavioural preparedness through integrated, context-sensitive, and factor-specific policies.

POSTER Agriculture · SGGW - Warsaw University of Life Sciences, Poland · ID 385

When stress speaks: Differential expression of ABA receptors reveals barley's drought response

Aleksandra Michońska

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Drought is one of the major environmental factors limiting crop productivity worldwide. Plants respond to water deficit through complex signaling networks, in which the hormone abscisic acid (ABA) plays a central role. Although ABA signaling has been widely studied, the role of ABA receptors in barley (*Hordeum vulgare* L.) is still not fully understood. In particular, it remains unclear how changes in receptor activity relate to the plant's ability to cope with drought stress. This study investigated the effects of drought stress and exogenous ABA on PYL (Pyrabactin Resistance 1-Like) gene expression and plant water status in barley seedlings.

One-week-old barley seedlings were assigned to four experimental groups: control, drought stress, exogenous ABA treatment, and combined ABA pre-treatment followed by drought. Relative expression levels of selected PYL genes were quantified in shoot tissues using qPCR and the 2-ΔΔCt method. In parallel, relative water content (RWC) was measured as a physiological indicator.

Exogenous ABA significantly upregulated most analyzed PYL genes, whereas drought stress alone generally reduced their transcript levels. Among the genes analyzed, PYL7 exhibited a progressive increase in expression under both ABA treatment and drought stress, with the highest expression observed in the combined group, suggesting a stress-responsive regulatory role. Notably, ABA pre-treatment significantly increased relative water content under drought compared with drought alone, indicating improved plant water status.

Together, these results demonstrate coordinated ABA-mediated regulation of both PYL gene expression and physiological drought response in barley. PYL7 emerged as a candidate receptor associated with ABA-responsive signaling under drought conditions, while changes in RWC confirm a functional physiological effect of ABA pre-treatment on drought performance in seedlings. Improved understanding of ABA signaling may support the development of climate-resilient barley cultivars and contribute to sustainable agricultural production under increasing water scarcity.

POSTER Agriculture · NMBU - Norwegian University of Life Sciences · ID 46

The role of digital advisory tools in supporting agroecological pests' management among smallholder farmers in Malawi.

Eluby Azariah Kawelama

NORWEGIAN UNIVERSITY OF LIFE SCIENCES

Pesticides have played a critical role in increasing agricultural productivity and meeting the food demands of a growing global population. In Malawi, where agriculture supports 80% of the population and contributes substantially to the national economy, pesticides remain a primary strategy for controlling crop pests and diseases. However, their widespread use poses significant risks to human health, biodiversity, and environmental sustainability. Agroecology offers a holistic pathway toward sustainable food systems that promotes ecological resilience while reducing dependence on external inputs such as pesticides; however, smallholder farmers lack timely, context-specific support to adopt agroecological pest management practices. Digital advisory tools could bridge this gap, provided they align with local farming knowledge and digital literacy levels. This study will examine how the Malawi Digital Plant Health Service (MaDiPHS)—an integrated national platform combining smartphone apps, web interfaces, and voice-based services (Viamo 321)—influences smallholder farmers' adoption of ecological pest management practices. Using a mixed-methods approach, the research combines survey data from MaDiPHS stakeholders with focus group discussions involving participating farmers. The study investigates how digital advisory tools influence pest management decisions, the opportunities and challenges farmers encounter when using these technologies, and how digital services can complement traditional extension support. By exploring digital agriculture in an agroecological perspective, this research contributes to ongoing discussions on building sustainable and resilient food systems. The findings are expected to provide insights into how digital innovations can strengthen integrated pest management, reduce reliance on chemical pesticides, and support more environmentally sustainable agricultural development in Malawi.

POSTER Agriculture · HUJI - Hebrew University of Jerusalem · ID 163

Generating Tobamovirus resistance by introducing heterologous immune receptors into tomato (Solanum lycopersicum)

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Tomato brown rugose fruit virus (ToBRFV) is an emerging tobamovirus that poses a severe threat to global tomato production by overcoming previously deployed resistance genes. The development of novel sources of genetic resistance is therefore essential for sustainable disease management. In this study, we investigated the ability of the *L4* allele (originating from *Capsicum annuum*) to confer recognition of ToBRFV and enhance resistance in tomato (*Solanum lycopersicum*).

To characterize the immune response mediated by *L4*, transient expression assays were performed in *Nicotiana benthamiana* leaves. Co-expression of *L4* and the coat protein of ToBRFV (CP-ToBRFV) triggered a visible hypersensitive response (HR), indicating specific pathogen recognition and activation of plant immunity. The strength of the immune response was further corroborated by ion leakage assays performed in *Nicotiana benthamiana* leaves, which revealed a significant increase in electrolyte leakage following co-expression of *L4* and CP-ToBRFV, consistent with the induction of a robust hypersensitive response. These results confirmed the induction of localized programmed cell death associated with effector-triggered immunity (ETI).

Four independent transgenic tomato lines (*Solanum lycopersicum*) expressing the *L4* have been generated and are currently being characterized. Future work will involve challenging these lines with ToBRFV and TMV to evaluate the resistance conferred by *L4*. Disease severity will be determined through symptom monitoring, while viral accumulation will be quantified using molecular assays. Together, these experiments will establish the effectiveness of the engineered resistance and provide insight into its potential for protecting tomato crops against ToBRFV infection.

POSTER Agriculture · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 60

Effect of different water sources on performance and nutritional value of yellow mealworm (Tenebrio molitor)

Michaela Šlechtová, Jakub Folke, Martin Kulma

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With the global population projected to reach 10 billion by 2050, identifying sustainable alternative protein sources is becoming important for global food security. Farmed insects, such as the yellow mealworm, offer a sustainable alternative with a low environmental footprint, yet the optimization of their rearing protocols, specifically regarding water supplementation, remains underexplored. The objective of this study was to assess the influence of six different water sources (agar, agar with sugar, carrots, potatoes, hydrogel, and water spraying) on the development, harvest parameters, and nutritional composition of yellow mealworm larvae. The experiment was conducted in climatic chambers at a constant temperature of 27 ± 1 °C and 60% relative humidity. A total of 3,000 larvae were divided into six groups, fed a substrate of wheat bran and broiler feed mixture, with tested water sources replenished ad libitum.

Results revealed that the form of water supplementation significantly affected both development and final larval weight. The shortest developmental cycle was observed in larvae supplemented with agar and hydrogel (approximately 45 days), whereas the spraying method extended development to nearly 58 days. The carrot-supplemented group achieved the highest individual larval weight and the most efficient feed conversion ratio. The nutritional profile was also modified depending on the treatment. Adding sugar to agar led to the highest lipid content, while the water-sprayed group showed the highest protein content accompanied by low lipid content.

This trial demonstrates that mealworms can complete their life cycle using all tested water sources, providing new insights into the effect of water forms on insect performance. Carrot, agar, and hydrogel proved to be more efficient than water spraying or potatoes. These findings provide valuable insights for sustainable insect farming practices, though results need to be verified at a larger scale alongside life cycle and economic assessments.

POSTER Agriculture · UHOH - University of Hohenheim, Deutschland · ID 125

Spatial assessment of irrigation profitability under alternative farm configurations in Southwestern Germany

Phuong Thao Pham, Jan Görtz

Climate change is increasing the frequency and severity of drought stress, thereby elevating production risks for farmers worldwide. These pressures are expected to intensify under future climate scenarios. While irrigation is one of the most direct adaptation measures available, its high capital and operational costs can limit adoption in practice. Understanding where and under what conditions irrigation is economically viable is therefore essential for supporting climate adaptation in agriculture. This study assesses the economic feasibility of irrigation in southwestern Germany under a severe drought projection. Farm-level cost–benefit analyses were conducted for different farm configurations and spatial characteristics in the southwest of Stuttgart, Germany, where agriculture is currently predominantly rainfed. The aim was to evaluate the extent to which irrigation may become a viable adaptation strategy under future drought conditions in currently rainfed agricultural systems. Furthermore, data on projected climate impacts on crop production and irrigation demand, generated using the Expert-N crop model, were available for this region and formed an essential input to the analysis. Although irrigation technology strongly affects investment and operating costs, the analysis was limited to the mobile hose-reel irrigation systems due to their widespread use and comparatively low costs. The results indicate that, under current farm-size conditions, the adoption of irrigation systems is profitable on less than 50% of the irrigable area. Increasing farm size reduces per-unit irrigation costs and substantially expands the economically viable area. Spatial heterogeneity in net benefits is mainly driven by groundwater depth, irrigation potential, and attainable crop profitability. The analysis also identifies feasible well–field distances to reduce costs in areas with deep groundwater. Overall, these findings provide insights to support farm-level irrigation investment decisions and regional adaptation planning under future climate change scenarios.

POSTER Agriculture · BOKU University, Austria · ID 33

Participatory approaches to understanding farmer-prioritised breeding objectives in Ethiopia and Ghana: a comparative and intersectional gender analysis

Linda Wernsperger

Participatory breeding approaches help improve productivity in plant and animal breeding by strengthening collaboration between scientists and farmers and by defining breeding objectives. Within this framework, priorities vary depending on the country, farming system, and household context. The PaTBOLiC project promotes collaboration among breeders in Ethiopia, Ghana, and Austria. This thesis analyses data from 234 households (152 in Ethiopia and 82 in Ghana) collected through semi-structured questionnaires.

The study, conducted mainly in male-headed mixed farming systems in Ethiopia and Ghana, examined farmers' preferences for sorghum traits. Across both countries, farmers prioritised high yield, drought resistance, and grain quality, while Ethiopian farmers placed additional emphasis on market value. Key differences were that Ghanaian farmers preferred strong stems, whereas Ethiopian farmers favoured more tillers. Drought, pests and diseases, and low yields were reported as the main production constraints.

While management, herd size, and mating systems show significant differences, farmers in both countries have similar breeding preferences. Ethiopian farmers prioritise milk yield, body size, and coat colour in cows, whereas Ghanaian farmers emphasise body size, milk yield, and mothering ability. For bulls, muscularity is the top trait in both countries, with coat colour also valued; Ethiopian farmers additionally prefer ploughing ability, while Ghanaian farmers focus more on growth. Both countries face challenges such as water shortages and diseases, with Ethiopia highlighting feed shortages and Ghana emphasising theft.

The project compares not only agro-ecological and economic conditions in Ethiopia and Ghana, but also differences between female- and male-headed households, adding a socio-demographic perspective. Ethiopia had a much more balanced gender participation than Ghana. Overall, men and women showed similar trait preferences, with only small differences in how important certain traits were. The study aimed to avoid simple gender divisions and instead take an intersectional approach, considering diverse forms of marginalisation in both countries.

POSTER Agriculture · BOKU University, Austria · ID 171

Marker-assisted selection for Bdv2 mediated Barley Yellow Dwarf Virus resistance in bread wheat: comparative performance of SSR and KASP markers and limitations in tracking Bdv3 introgressions

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Barley Yellow Dwarf Virus (BYDV) is a major viral disease of wheat worldwide, causing substantial yield losses through aphid-mediated transmission. Two resistance genes introgressed from Thinopyrum intermedium are widely used in breeding: *Bdv2*, located on the long arm of chromosome 7D, and *Bdv3*, carried on a 7E translocation. Because phenotypic screening for BYDV resistance is challenging and influenced by environmental conditions, marker-assisted selection (MAS) provides an efficient alternative for resistance introgression.

We evaluated SSR markers reported by Ayala et al. (2001) and Kong et al. (2009), together with a *Bdv2*-specific Kompetitive Allele-Specific PCR (KASP) marker, in a BC_1F_1 population of 126 plants derived from crosses between six susceptible commercial wheat cultivars and resistant donor lines carrying *Bdv2* and *Bdv3* alien introgressions originating from Australian and US germplasm sources.

The *Bdv2*-specific KASP marker consistently differentiated resistant and susceptible genotypes and proved suitable for high-throughput screening. However, it could not distinguish heterozygous from homozygous resistant individuals. In contrast, SSR markers generated codominant profiles that enabled clear identification of heterozygous and homozygous *Bdv2* carriers when fragments were resolved by polyacrylamide gel electrophoresis (PAGE). Neither conventional agarose nor high-resolution MetaPhor agarose gels provided sufficient resolution for reliable zygosity determination. Chi-square analysis showed no significant deviation from the expected 1:1 Mendelian segregation ratio, indicating normal transmission of the *Bdv2* introgression in the evaluated BC_1F_1 populations.

Several breeding lines presumed to carry the alternative resistance gene *Bdv3* could not be reliably identified using the available *Bdv3*-linked marker or Xgwm37 and exhibited marker profiles comparable to susceptible controls. These findings establish an effective MAS framework for *Bdv2* introgression while highlighting the need for improved molecular diagnostics to facilitate the deployment and pyramiding of multiple BYDV resistance sources in wheat breeding.

POSTER Agriculture · BOKU University, Austria · ID 301

The Impact of Climate Change on the Physiology of Dactylis glomerata and Lolium perenne: Effects of Temperature and Drought Stress and Selected Forage Quality Parameters

Kerim Diman

Österreich

Abstract:

Climate change is increasing the frequency and intensity of heat waves and drought periods, posing a growing challenge to grassland systems and their productivity. This study investigated the physiological and nutritional responses of two important forage grasses, Lolium perenne (perennial ryegrass, cv. Novello) and Dactylis glomerata (orchardgrass, cv. Aldebaran), to heat stress (30 °C day / 19 °C night), drought stress (30 % pot capacity), and their combination under controlled climate chamber conditions over 14 days. Chlorophyll fluorescence (Fv/Fm) was measured every two days as an indicator of photosystem II integrity. At harvest, neutral detergent fiber (NDF), acid detergent fiber (ADF), and crude protein content were analyzed using the Van Soest method and Dumas combustion. Combined heat and drought stress (HS+DS) caused the strongest reduction in Fv/Fm in both species, followed by heat stress alone, while drought stress alone had only a moderate effect. Heat stress significantly increased NDF and ADF levels in both grasses, with D. glomerata consistently showing higher fiber fractions than L. perenne. Crude protein responded in a species-specific manner: a significant interaction between species and treatment. These findings demonstrate that combined stressors exacerbate photosynthetic damage beyond individual stress effects and that forage quality, particularly fiber content, is substantially affected by elevated temperatures. The results contribute to a better understanding of species-specific stress responses and support the selection of suitable grass varieties for future climate conditions.

POSTER Agriculture · L'Institut Agro, France · ID 10

The impact of anti-methanogenic feed additives on dairy cow welfare

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In order to reduce methane emissions from livestock farming and meet global recommendations for reducing greenhouse gas emissions, a new class of additives has emerged: Anti-Methanogenic Feed Additives (*AMFAs*), which are chemical compounds that can inhibit the methanogenesis cycle in ruminants. Although highly effective, there is currently no literature on their impact on the welfare of dairy cattle.

As part of a study on the performance of two AMFAs (3-NOP and NO3-), several methods and protocols were implemented to measure their potential impact on the welfare of Holstein dairy cows. The behaviours studied were activity (particularly the animals' rest cycles), feeding, individual behaviour and social behaviour (agonistic or positive).

The results showed that there were some significant variations between animals fed NO3- and the other two groups (including the control group) in terms of rest cycles and feeding, but the results are not sufficient to conclude that this AMFA could potentially harm animal welfare. Further studies, particularly behavioural analysis in contexts other than those mentioned here, appear to be necessary

POSTER Agriculture · WUR - Wageningen University & Research, Nederlands · ID 259

Determining the cumulative effects of climate change and fishing efforts on productivity of commercial fishes in the North Sea ecosystem.

Sabiha Sultana

Wageningen University & Research

Climate change directly influences the food resource availability of the North Sea ecosystem, which has bottom-up control on the productivity of higher trophic levels in this region. Parallelly, fishing activities are increasing anthropogenic pressures on fish abundance at multiple trophic levels in this ecosystem. Existing modeling approaches seem to overlook the cumulative impact of climate change and fishing on trends of productivity at multispecies fisheries while simultaneously considering the emergent trade-offs between trophic guild interactions. The current study used a multispecies, spatially explicit food-web model, OSMOSE, to explore the shifts in maximum sustainable yield (MSY) of target species in a mixed fishery. It investigated two different climate-driven and multiple fishing effort scenarios. The model represented five functional groups of lower trophic level (LTLs) and fourteen different metiers targeting commercial species from three different trophic guilds to construct an effective illustration of the North Sea food web. The key findings exhibited alterations in optimal yields (MSY) and reproductive stock of modeled species due to climate-induced spatial and temporal variations in food availability, indicating sensitivity of higher trophic levels to energy transfer efficiency. The ecological indicators demonstrated that planktivores and benthivores were highly vulnerable to fishing gears, resulting in a smaller-sized fish community structure and a larger mean trophic level of consumers under intensive fishing scenarios. Climate variation amplified the multispecies yield curves, while the optimal effort level for relative yield showed resilience. While pelagic planktivores were the key contributors to the multispecies maximum sustainable yield (MMSY), large demersal piscivores appeared to be the least climate-resilient trophic guild. Overall, the consistent decline (~7%) in total biomass at any fishing effort level under future climate conditions indicated a synergistic effect of climate variation on projected production of the system.

POSTER Agriculture · WUR - Wageningen University & Research, Nederlands · ID 112

Influence of different tillage practices and depth on microbes and functional genes of the nitrogen cycle

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A good functioning, healthy soil is important to grow crops. However, current soil health monitoring mostly focuses on physical and chemical parameters but lacks informative biological parameters. Microbial communities respond much faster to management changes than chemical or physical parameters. This thesis focussed on the response of bacteria, fungi and functional genes involved in the nitrogen cycle as indicators for soil health in agricultural soils. The aim was to, first, study the influence of soil depth on 16S, ITS, microbial biomass carbon (Cmic), alkaline metallopeptidase (apr), archeal ammonia monooxidase (AOA), and bacterial ammonia monooxidase (AOB) under conventional (CT) and reduced tillage (RT). Secondly, the sensitivity to layer effects of qPCR and Cmic, two different methods used to measure microbial biomass, was compared. Samples were taken from long term field experiments in France, Finland, Austria, Switzerland, Germany and Spain. The influence of tillage and depth was tested using general linear mixed models (GLMMs). Furthermore, piecewise structural equation modelling (pSEM) was used to explore what pathways influenced the parameters. Our results showed a significant decrease over depth for all parameters. Layer effects were more pronounced in RT, CT showed more overlap. PERMANOVA and pSEM both also showed a significant layer effect. Sites explained a large part of the variation, indicated by the large increase of conditional R2 compared to marginal R2. Between tillage practices, few significant differences were found. Only TOC and Cmic in L1 were significant higher in RT than in CT. PERMANOVA showed no significant effect of tillage. pSEM results indicated no direct effects, but different pathways for CT and RT indicated indirect tillage effects. Our results showed that Cmic and the microbial parameters studied with qPCR are well suited to display layer effects but generally cannot distinguish between tillage systems. Though, Cmic showed higher sensitivity towards management practices.

POSTER Agriculture · WUR - Wageningen University & Research, Nederlands · ID 204

Exploring the efficiency of integrated parasite management in cattle farming in pastures of high biological value : a case study in Wallonia (Belgium)

Isabelle Pajot

In grazing cattle farming, antiparasitic drugs are extensively used to control endoparasitic infections; however, their repeated administration may lead to pasture contamination through excreted, potentially ecotoxic residues and contribute to the development of parasite resistance. Integrated parasite management (IPM) aims to address these concerns while maintaining effective parasite control.

This thesis evaluated the effectiveness of IPM through two complementary dimensions: endoparasite burden, measured by eggs per gram (EPG) of cattle feces, and environmental contamination, assessed through the quantity of residues of four antiparasitics excreted in feces, including the ecotoxic antiparasitic substance closantel. Fecal samples were collected under controlled conditions and from farms applying IPM practices or following conventional parasite management. In addition, the study explored potential cross-contamination pathways of closantel residues in non-treated cows through a literature review.

Parasite pressure remained comparable to conventional management practices, with no statistical difference between their two mean values, indicating that reduced treatment use did not compromise parasite control. At the same time, IPM reduced environmental exposure to the most ecotoxic antiparasitic residues through treatment guidance and post-treatment confinement measures, although effectiveness varied according to the active substance and formulation.

Overall, IPM provides an effective framework for balancing parasite control with environmental protection and highlights the need to refine recommendations and strengthen parasite monitoring. Closantel residues detected in non-treated cows suggested indirect within-herd exposure, with water trough contamination identified as the most plausible route. These findings suggest that cross-contamination potentially contributes to parasite resistance and emphasize the need to further investigate within-herd contamination pathways when implementing targeted treatment strategies in the framework of IPM.

POSTER Agriculture · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 214

Tiny Tenants, Big Impact: Fungal endophytes as tools for sustainable wheat production

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Fungal endophytes are ubiquitous components of the plant microbiome that can influence host growth, development, and responses to environmental stress. As agriculture faces increasing pressure to produce more with fewer chemical inputs, these naturally occurring microbial partners offer exciting opportunities for sustainable crop improvement. This study investigates the potential of a diverse collection of fungal endophytes to promote wheat growth and development and contribute to resistance against economically important Fusarium pathogens as well as drought.

A systematic screening approach was established to evaluate endophyte-mediated effects on wheat under controlled conditions. Individual fungal isolates were assessed for their influence on plant growth and developmental traits, while selected candidates were further examined for their ability to support regeneration. In parallel, ongoing pathogen/drought-challenge experiments are evaluating the capacity of endophytes to mitigate the effects of Fusarium species as well as drought stress. By integrating these traits, we aim to identify multifunctional endophytes capable of simultaneously promoting plant performance and contributing to disease protection.

Our ongoing screening has revealed a remarkable diversity of plant responses, ranging from neutral interactions to pronounced growth-promoting effects. Several isolates have emerged as promising candidates, displaying positive influences on wheat vigour and developmental traits. Preliminary observations further indicate that selected endophytes may reduce the impact of Fusarium infection as well as impart tolerance against drought, highlighting their possible role in supporting plant immunity and health.

These findings reinforce the concept that microbes can serve as valuable allies in future cropping systems. By identifying fungal endophytes with multiple advantageous traits, this work contributes to the development of biologically based strategies for wheat improvement and disease management. Ultimately, these “tiny tenants” may become powerful tools for building more productive, resilient, and sustainable agricultural systems.

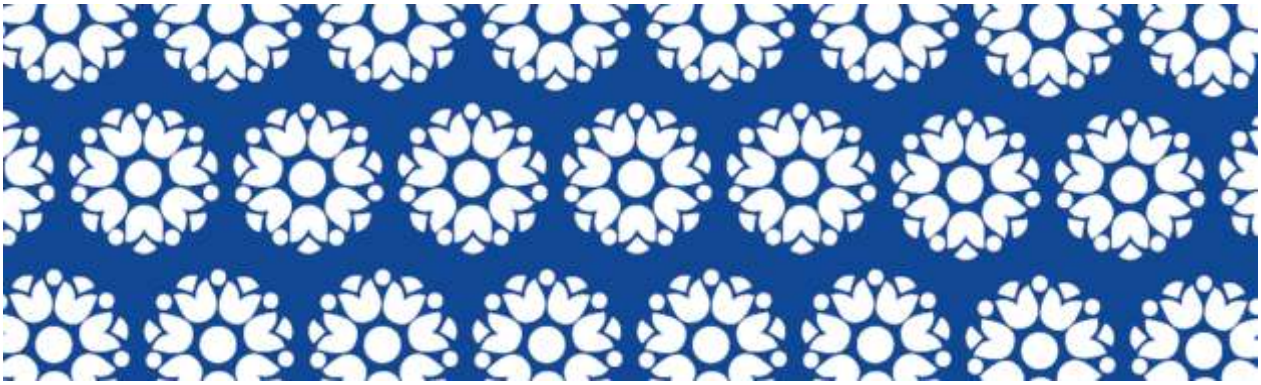
POSTER Agriculture · EMU - Estonian University of Life Sciences · ID 36

CNC drilling of wear-resistant Hardox 450 steel using HSSCo solid drills with variable feed rates

Maicel Pütt, Marten Madissoo

Estonian University of Life Sciences

Wear-resistant martensitic plates are widely used in agricultural machinery but are difficult to drill during fabrication and repair. This study compared constant-feed and depth-adaptive CNC drilling of 12 mm Hardox 450 using cost-effective 8 mm HSS-Co twist drills under flood cooling. Axial force was recorded in real time using a Kistler piezoelectric dynamometer and interpreted together with repeated-hole behaviour, tool-edge condition, and chip morphology. Constant feed produced a representative peak force of about 2130 N and progressive instability over three holes. Adaptive feed, applied through a depth-dependent schedule over the final 3 mm of the through hole, lowered the peak to about 870 N, corresponding to a reduction of about 145%, while smoothing breakthrough, limiting visible edge damage, and producing more controlled chips. Simple breakthrough-oriented feed reduction can therefore improve short-run drilling stability without changing tool type or machine platform and extend the practical use of economical HSS-Co drills for agricultural wear parts.



TRACK

Animal Sciences

From barns to ecosystems - what animELLS in between?

19 abstracts · 9 oral presentations · 10 posters

ORAL Animal Sciences · HUJI - Hebrew University of Jerusalem · ID 50

Impact of colostrum fat matrix on growth and immune function of dairy goat kids

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Colostrum provides crucial passive immunity to newborn goat kids through maternal antibodies. However, there is limited knowledge about how the surrounding matrix of colostrum influences metabolism, growth, and immunity. This research aimed to assess how different sources of colostrum fat and IgG impact IgG absorption efficiency and postnatal growth performance.

Forty-four newborn kids were randomly assigned to four colostrum sources: pooled-whole colostrum (PC; n=12, BW=2.98±0.12 kg), pooled-skimmed colostrum with vegetable oil (PO; n=10, BW=3.13±0.15 kg), adult goat serum formula with colostrum fat (SF; n=11, BW=2.75±0.20 kg), or adult goat serum formula with vegetable oil (SO; n=11, BW=2.61±0.15 kg). Treatments were administered at 10% of BW during the first 24 h of life. Blood samples were collected at 24 and 48 h for IgG and IgM analysis, and BW was recorded at 30 and 60 d. Data were analyzed using a mixed model with repeated measures.

BW was influenced by colostrum source, being highest in SF (8.43 kg, $P< 0.01$) and lowest in SO (6.82 kg), with PC and PO falling in between (7.84 kg). ADG was significantly greater ($P< 0.03$) during the first 30 d (125 g/d) compared to 60 d (113 g/d). A partial analysis (n=5) showed serum IgG at 48 h was lower (8.14 mg/ml) than at 24 h (9.23 mg/ml). IgG concentration was numerically lowest with SO (5.72 mg/ml) compared to other sources (9.67 mg/ml).

These findings highlight the effectiveness of the colostrum serum formula in sustaining passive immunity, growth rate, and BW. It appears that IgG absorption at 24 h was not influenced by the source or concentration of IgG (serum vs. colostrum) but was affected by the type of fat used (cream vs. vegetable oil).

ORAL Animal Sciences · UHOH - University of Hohenheim, Deutschland · ID 321

Towards climate-efficient livestock production: Evaluating methane (CH4) emission intensity of three cattle breeds in alpine grazing environments

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[2] Agroscope

Enteric CH4 emissions from ruminants have attracted major attention due to their contribution to greenhouse gas emissions and climate change. This study evaluated the emission intensity of three cattle breeds, namely Hinterwälder (HW), Original Brown Swiss (OB), and Holstein (HO) representing different productivity levels by quantifying enteric CH4 emissions from 57 lactating cattle under alpine grazing conditions across three seasons (spring, summer, and autumn). Data on enteric CH4 emissions were collected using the GreenFeed device (GFD) and mean daily milk production was recorded during a grazing trial conducted from June to August 2025 on the Weissenstein Alp, Switzerland. The obtained data were analysed using one-way analysis of variance (ANOVA) and Pearson's correlation to identify differences among breeds and to assess associations between CH4 emissions and production parameters.

The findings showed that HO had the highest yield with a mean of 13.52 ± 0.97 kg/day (range 5.29-19.05; n=14), and OB the lowest yield with a mean of 11.39 ± 1 kg/day (range 1.46-19.5; n=20). Daily CH4 emissions were highest for OB with a mean of 257.73 ± 10.52 g/day (range 173.72-346.56) and lowest for HW with a mean of 204.38 ± 10.75 g/day (range 93.7-352.54; n=23). Consequently, CH4 intensity (in g per kg of milk) was 17.76 for HO, followed by HW (17.37 g/kg) and OB (22.63 g/kg).

No significant difference was observed in emissions with the seasonal shift nor was a significant effect of breed and season on CH4 intensity observed. Milk yield and CH4 intensity were found to have a statistically significant negative correlation, suggesting that highly productive animals have better emission efficiency.

Although the dataset was small, the results help in understanding CH4 dynamics in alpine grazing environments, enhancing climate-efficient breed selection and CH4 mitigation strategies for sustainable livestock production.

ORAL Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 72

Non-Invasive Assessment of Oxidative Stress in Birds through Fecal Malondialdehyde (MDA) Determination

Anna Śnieg, Wiktoria Kościów

Oxidative stress results from an imbalance between the production of reactive oxygen species (ROS) and the organism's antioxidant defense capacity. In birds, oxidative stress may increase due to physical exertion, transport, environmental challenges, falconry training, and the high metabolic demands associated with flight. One of the most widely used biomarkers of lipid peroxidation is malondialdehyde (MDA), a product of polyunsaturated fatty acid degradation. Although MDA is commonly measured in blood, plasma, serum, or tissues, collection of these samples requires animal restraint and may itself induce stress, potentially affecting the results. Consequently, there is growing interest in non-invasive approaches based on fecal samples.

The aim of this study was to evaluate the feasibility of using fecal MDA concentration as a non-invasive indicator of oxidative stress in Harris's hawks (Parabuteo unicinctus) used in falconry. Fecal samples were collected non-invasively immediately after defecation, both before and after falconry training sessions. Samples were stored at −20°C until analysis, homogenized in phosphate-buffered saline (PBS), and centrifuged to obtain the supernatant. MDA levels were determined using the thiobarbituric acid reactive substances (TBARS) assay and spectrophotometric analysis.

Preliminary results confirmed that MDA can be successfully detected and quantified in fecal samples from Harris's hawks. Moreover, a tendency toward increased MDA concentrations was observed after physical exercise compared with pre-training samples, suggesting enhanced lipid peroxidation and oxidative stress associated with exertion. Individual variation among birds was also noted, potentially reflecting differences in training status, temperament, and exercise intensity.

These findings indicate that fecal MDA analysis may provide a valuable non-invasive tool for assessing oxidative stress, physiological workload, and welfare in raptors used in falconry. As a pilot study, this work may serve as a foundation for further research on non-invasive oxidative stress biomarkers in avian medicine and welfare monitoring.

ORAL Animal Sciences · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 42

The quality of the handler-dog relationship in relation to the results of the dog-assisted therapy certification

Tereza Otcová

The human–dog relationship represents an important factor that may influence not only everyday coexistence but also the working and therapeutic involvement of dogs. In dog-assisted therapy (DAT), the quality of cooperation between the handler and the dog is considered a key prerequisite for safe and effective involvement. However, no studies have directly examined the impact of this relationship on the outcomes of certification tests for therapy dogs. The study aimed to determine whether and how the quality of the handler–dog relationship influences the dog's behaviour during a therapy dog certification test, and whether the handler's experience in DAT affects the dog's performance. Data were collected during certification testing of therapy dogs (N = 53). Handlers completed the MDORS questionnaire, which evaluates the human–dog relationship across three dimensions (interaction, emotional closeness, and perceived costs). The certification test evaluated dog obedience, responses to human contact and distractions, and undesirable behaviour, under committee assessment. MDORS dimensions were not significantly associated with certification test performance, but interaction and emotional closeness showed a positive association. Higher scores in response to human contact were also associated with higher scores in obedience and response to distracting stimuli. Furthermore, handler experience significantly reduced the likelihood of undesirable behaviour in dogs and improved obedience performance. In contrast, increasing handler age was associated with decreased obedience performance and responses to distracting stimuli.

In conclusion, a notable finding was an association between higher handler age and poorer dog obedience and responses to distracting stimuli, which may represent a risk to both client safety and dog welfare in DAT. Proper preparation of the dog, including obedience, adaptation to complex environments, and practical training in therapy methods, appears to be crucial for reliable certification. This study contributes to a poorly explored field and supports further research on testing and therapy dog welfare.

ORAL Animal Sciences · Lincoln University, New Zealand · ID 140

Beyond Male Alliances: the conservation significance of female bonds in bottlenose dolphins

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[1] Monitoring officer at Seawatch Foundation
[2] Professor

Bottlenose dolphin (Tursiops truncatus) male alliances have been extensively studied. However, female social assocations remain understudied despite evidence that female bonds are structured, kin-based and enduring. Semi-resident populations in Cardigan Bay, Wales, provide an opportunity to investigate female sociality due to their long-term site fidelity and individual histories. Social structure embodies a significant segment of interactions among organisms. Understanding female social structure is critical for conservation, as stable social bonds influence reproductive success, calf survival and population resilience.

This study, using data collected before and during my 2025 internship with the Seawatch Foundation for my Masters of International Nature Conservation, investigates the social structure of female bottlenose dolphins, examining how calf presence influences association patterns. Using 20 years of observational data and social network analyses I examine approximately 70 identified females and quantify association strength using the Half-Weight Index. Network analyses assess non-random preferential associations, the temporal stability of social relationships, and network metrics among females while accounting for reproductive state and habitat use.

The research outputs are expected to improve understanding of female social structure in bottlenose dolphins, including how social bonds form, persist and influence reproductive and calf rearing success. The results will inform management strategies that protect socially important individuals and habitats, particularly in resident populations exposed to ongoing anthropogenic pressures. As coastal ecosystems face growing human impacts, understanding aspects of dolphin socio-biology that have received limited attention, particularly among females, is increasingly important for effective conservation and long-term population resilience.

ORAL Animal Sciences · EMU - Estonian University of Life Sciences · ID 245

The Effect of Water Saturated Far-Infrared (FIR) Emitting Bioceramic Bandages on Equine Distal Limb Thermoregulation

Arina Polujanenkova, Felipe Corrêa
Estonian University of Life Sciences

Effective cryotherapy of the equine distal limb is a critical component of regenerative medicine, laminitis prophylaxis, and the mitigation of musculoskeletal pathologies. Emerging functional textiles incorporating far-infrared (FIR) emitting bioceramic textiles present a novel paradigm in the field of effective recovery. It is hypothesized that FIR-emitting textiles may counteract biological cold-induced vasoconstriction when applied to a limb in saturated state by promoting localized vasodilation and enhancing blood flow, therefore accelerating the transport of the core heat to the surface and more efficient evaporative cooling.

This study was designed as a randomized controlled trial. 12 horses of varying age, breed, and discipline were enrolled. Every horse followed a standardized 20-minute lunging protocol (5 minutes walk, 10 minutes trot, 5 minutes canter) in an uninsulated indoor riding arena. Following exercise, a water-soaked FIR-emitting bandage was applied to a randomly selected forelimb for 15 minutes. The contralateral forelimb served as an internal control via application of a standard polyester water-soaked bandage, while hind limbs remained unbandaged as external controls. Infrared thermography (IRT; Thermidas IRT-384 VET) was used to capture thermal profiles of metacarpal and metatarsal region, assessing changes in their temperatures. Baseline thermogram was taken before the exercises, followed by thermograms after the exercise before the application of the bandages and after the removal of the bandages. Thermograms 15, 30 and 45 minutes post-removal were conducted to evaluate changes in limbs' temperatures.

The comparison of lateral aspects of metacarpal and metatarsal area showed no significant differences between application of FIR-emitting bandages and polyester bandages.

ORAL Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 334

Acute phase proteins in donkeys: evaluation of serum amyloid A as a marker of inflammatory status

Katarzyna Baranowska[1], Edith Bardet[2], Maciej Perzyna[1], Maria Puchalska[1]

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Donkeys are often described as stoic animals, and clinical signs of disease may remain subtle or nonspecific in this species. For this reason, laboratory markers that reflect early inflammatory processes are particularly valuable in routine health monitoring. Acute phase proteins (APPs) are widely used in veterinary medicine as objective indicators of systemic inflammation, but species-specific data for donkeys remain limited.

The aim of this study was to evaluate SAA concentrations in clinically healthy donkeys and to provide baseline data that may support the interpretation of acute phase responses in this species. The study was designed in accordance with the recommendations of the American Society for Veterinary Clinical Pathology (ASVCP) and the Clinical and Laboratory Standards Institute (CLSI) for the establishment of reference intervals.

The study population included approximately 176 clinically healthy donkeys of both sexes. All animals underwent clinical examination to exclude overt infectious, inflammatory, or chronic conditions that could influence acute phase protein concentrations. Blood samples were collected from the jugular vein during routine veterinary procedures. Serum was obtained by centrifugation and stored at −80°C until further analysis.

Serum amyloid A concentrations were measured using an enzyme-linked immunosorbent assay (ELISA). Samples were analysed according to the manufacturer's protocol and tested in duplicate to improve analytical reliability. Statistical analysis was performed to determine the distribution of SAA values and to establish reference intervals for clinically healthy donkeys. The potential effects of age and sex on SAA concentrations were also assessed using appropriate statistical methods.

This study provides species-specific baseline information on SAA as an acute phase protein in donkeys. Establishing such data may improve interpretation of inflammatory markers in clinical practice and support the development of more objective diagnostic tools for health assessment in this species.

This study was cofunded by the Warsaw University of Life Sciences 2025 grant program.

ORAL Animal Sciences · University of Lleida, Spain · ID 186

The Usefulness of Virtualizing Surgical and Clinical Procedures

Nerea Alvarez Gomez, Olga Blanco Prieto, Eric Carmona Perez, Mònica Navarrete Prat, Sergio Rodríguez Zapater

The traditional teaching of surgical and clinical procedures in veterinary medicine relies on cadavers and real patients. However, these approaches present ethical and economic limitations and offer limited opportunities for students to learn at their own pace, repeat procedures as needed, and develop self-directed learning skills. Audiovisual resources may help address some of these challenges by improving students' preparation before clinical practice.

To evaluate their educational value, instructional videos were produced from surgical procedures performed on patients undergoing routine interventions at the UQD of the UdL. All procedures followed strict surgical, anaesthetic, and analgesic protocols and were recorded and edited for educational purposes. Surgery students were divided into two homogeneous groups: one group viewed the videos before the practical sessions, while the other followed the standard teaching methodology. Also, there were some questionnaires, which were completed before and after the practical sessions to asses perceived preparedness, confidence, understanding of procedures, and the need for supervision.

Although 77.1% of students reported theoretical knowledge of the surgical technique, 87.5% experienced high levels of anxiety when facing real surgical procedures. That anxiety decreased after completion of the practical sessions across the whole population (pre: 6.74 ± 6.33; post: 5.07 ± 4.94; $p \leq 0.05$), regardless of video exposure. However, students who viewed the videos felt significantly better prepared before the practical session (3.50 ± 0.79 vs. 2.97 ± 1.10; $p \leq 0.05$) and estimated requiring fewer repetitions to achieve autonomy (3.50 ± 0.96 vs. 4.18 ± 1.07; $p \leq 0.05$). Additionally, 94.1% of participants expressed willingness to use audiovisual resources as a complementary learning tool.

These findings suggest that audiovisual resources are a valuable complement to veterinary surgical training. Although they cannot replace hands-on clinical experience, they may enhance preparedness, promote autonomous learning, and optimize the educational value of practical training.

ORAL Animal Sciences · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 150

Beyond SCSA: evaluation of the Nicoletti assay for rapid and scalable sperm DNA fragmentation analysis in livestock reproductive biotechnology

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Analysing DNA quality and fragmentation is essential in the field of veterinary assisted reproductive biotechnology, as sperm DNA fragmentation (SDF) has been found to negatively correlate not only with male fertility in multiple livestock species but also with post-fertilisation development of embryos. High levels of SDF are closely associated with lower pregnancy rates and blastocyst formation, as well as a higher risk of abortion. A common method used to measure SDF is the Sperm Chromatin Structure Assay (SCSA), which is often labor-intensive, time-consuming, and uses hazardous reagents. This study evaluates the Nicoletti assay (NA) as a faster, simpler, and more robust alternative to accurately assess SDF for clinical management and reproductive health monitoring.

The experiment used semen samples from multiple livestock species, including cryopreserved (-196°C) samples from rams, bulls and roosters, as well as chilled (17°C) samples from boars. Before freezing the samples at -80°C for the eventual SCSA and NA analyses, a comprehensive baseline evaluation was performed using basic flow cytometry and Computer-Assisted Sperm Analysis (CASA) to track initial cell characteristics and movement patterns. In order to test the analytical accuracy and sensitivity of both assays, a positive control was created by adding ferrous sulfate, an exogenous oxidative agent, to deliberately induce DNA damage.

This model directly quantifies the diagnostic ability, reproducibility, and protocol efficiency of NA relative to SCSA. By comparing these two methods across both mammalian and avian species, which have notably different sperm cell structures, this research establishes the boundaries of the Nicoletti protocol's versatility. Validating this method will offer breeding programs and veterinary laboratories a highly accessible and rapid screening tool. Furthermore, transitioning to this simpler alternative can significantly lower susceptibility to technical errors, reduce toxic chemical waste, and increase time efficiency without sacrificing analytical accuracy in livestock reproductive management.

POSTER Animal Sciences · University of Lleida, Spain · ID 155

Intraoperative Analgesic Effects of Maropitant in Cats Undergoing Ovariohysterectomy

Ramón Soler Albuixech, Olga Blanco-Prieto, Sergio Rodríguez-Zapater

Maropitant citrate is a neurokinin-1 (NK-1) receptor antagonist widely used as an antiemetic in veterinary medicine. Recent evidence suggests potential visceral analgesic effects, making it a candidate as an analgesic adjuvant in perioperative settings. Its long elimination half-life (>17 hours) may be particularly advantageous in feline patients, where postoperative oral medication can be challenging. Feline ovariohysterectomy is also commonly one of the first intra-abdominal procedures performed by junior veterinary surgeons, where consistent analgesia is especially relevant.

This study aimed to evaluate whether maropitant citrate reduces intraoperative nociception during ovariohysterectomy in cats.

This retrospective study included 12 healthy female cats, aged 1–2 years and weighing 2–4 kg, undergoing elective ovariohysterectomy at the UQD of the UdL. Animals were allocated into a control group and a maropitant-treated group. All cats received a standardized anaesthetic protocol with dexmedetomidine (10 µg/kg), ketamine (3 mg/kg), methadone (0.2 mg/kg), propofol induction (1 mg/kg IV), and isoflurane maintenance. Maropitant (1 mg/kg IV) was administered 20 minutes before incision. Intraoperative monitoring was performed by an anaesthetist and included heart rate, respiratory rate, end-tidal CO_2, arterial blood pressure, oxygen saturation, rectal temperature, and inspired isoflurane concentration at predefined surgical time points (pre-incision, muscular incision, ovarian traction and ligation, uterine ligation, muscular suturing, and end of surgery).

End-tidal CO_2 was significantly lower in the treated group (38.8 ± 3.0 vs 40.5 ± 2.4 mmHg; $p < 0.05$). Heart rate showed no significant intergroup differences, although both groups showed significant increases compared with baseline and final values during traction of the second ovary, uterine manipulation/ligation, and muscular suturing. Fentanyl as rescue analgesia was required in two control cats and none in the treated group.

These findings suggest a potential analgesic-sparing effect of maropitant and support its use as a visceral analgesic adjuvant. Further prospective studies are required.

POSTER Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 312

Comparative in silico analysis of pathogenic mutations in SLC family genes (SLC7A9, SLC3A1, SLC2A9) causing hereditary kidney stones in dogs as translational models for humans

Natalia Szczygłowska

Hereditary kidney stone disease, including cystinuria and hyperuricosuria are severe conditions affecting both humans and domestic dogs. They are frequently caused by genetic errors in the solute carrier (*SLC*) family of genes, specifically *SLC7A9*, *SLC3A1*, and *SLC2A9*. These genes encode essential cellular pumps in the kidneys, and their failure leads to a dangerous buildup of stone-forming substances. Because dogs share human environments and suffer from nearly identical forms of these diseases, they represent excellent natural models for studying human conditions. This study aimed to perform a comparative *in silico* analysis of disease-causing mutations within these genes to validate the canine model for developing future therapies.

Three main computational approaches were utilized. First, sequence alignment tools (Clustal Omega v.1.2.4) were used to compare the genetic code across species to assess evolutionary conservation. Second, predictive algorithms (PolyPhen-2 v. 2.2.3) were applied to mathematically evaluate how specific amino acid changes damage the protein's structure. Finally, protein relationships were mapped using interaction databases (STRING v.12.0) to analyze functional dependencies.

The findings indicate a high degree of evolutionary conservation at the mutated sites (sequence identity of 88.78% between *Canis lupus familiaris* and *Homo sapiens*), highlighting their critical biological importance. Predictive analyses categorized the selected missense mutations are highly deleterious (PolyPhen-2 score of 1.000), leading to significant structural damage. Furthermore, interaction mapping revealed that these transporters do not work alone but form highly dependent biological networks (interaction confidence score of 0.999 between SLC7A9 and SLC3A1), which are severely disrupted by these genetic errors.

By confirming the structural and functional similarities of these genetic defects between both species, this research strongly supports the use of the canine model in the ongoing search for effective treatments for human hereditary kidney diseases. The integrated bioinformatic approach highlights the translational value of studying canine inherited nephropathies.

POSTER Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 314

Trends in the showing of selected breeds of cats in Poland

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The development of modern felinology has been shaped by the establishment of international federations of purebred cat enthusiasts and the expansion of the cat show industry, which has contributed to the recognition of many new breeds. Some of these breeds originated from spontaneous point mutations, such as the Devon Rex (DRX), while others, such as the Bengal (BEN), were developed through deliberate crossbreeding of domestic cats with wild felines.

The aim of this study was to analyze the exhibition history of selected purebred cat breeds — British Shorthair (BRI), Bengal (BEN), Russian Blue (RUS), and Devon Rex (DRX) — at cat shows held in Poland under the auspices of The International Cat Association (TICA) and the Fédération Internationale Féline (FIFe). The study compared breeds with a long-established breeding history, represented by BRI and RUS, with breeds that emerged in the 20th century as a result of mutation or hybridization, represented by DRX and BEN.

The analysis was based on show catalogs from TICA and FIFe from 2012 to 2024. The study included breed presence at international cat shows, gender distribution, show classes and categories, and the frequency of selected coat colors. The effects of year, federation, and their interaction on the analyzed traits were also considered.

The results showed a stable presence of British Shorthair cats and Bengal cats at exhibitions, while Devon Rex cats demonstrated a significant increase in show participation ($P<0.05$). A sharp decline in the number of exhibited cats was observed in 2020, which was associated with restrictions on mass events during the Covid-19 pandemic. Female cats were exhibited more frequently than males, reflecting the typical structure of purebred cat breeding. Significant effects of the analyzed factors were found for most age categories, gender distribution, and selected coat colors ($P<0.05$).

POSTER Animal Sciences · HUJI - Hebrew University of Jerusalem · ID 15

Feeding Hydroponic Barley Sprouts to Early Lactation Dairy Goats: Consequences for Intake, Nutrient Utilization, Milk Performance, and Immune Markers

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This study assessed incorporating barley sprouts (BS) in dairy goat's diet. Multiparous dairy goats in the early stages of lactation were given diets with BS to evaluate the effects on feed consumption, nutrient digestibility, milk production and composition, and blood and immune parameters over six weeks. Goats were provided with either a control diet or diets with BS harvested at 5 or 7 days. Milk production and composition were measured and analyzed; samples of feces, rumen fluid, and blood were collected during the final week of the study. The expression of immune genes was assessed in weeks 3 and 6.

Data were evaluated using a mixed model, considering diet, time, and their interaction as fixed effects, while treating goat within diet as a random effect. Control goats exhibited a higher dry matter intake (2.60 vs. 1.53 kg/d; $P < 0.01$) and produced more milk and energy-corrected milk ($P < 0.004$) compared to those on BS diets. However, there were no differences in milk fat, protein, and lactose concentrations. Feed efficiency remained unaffected by the inclusion of BS. Apparent digestibility of organic matter and gross energy was lower ($P< 0.01$) in control goats than in those fed BS, suggesting enhanced energy utilization with SB inclusion. Goats on the 5-day barley sprout diet exhibited increased HSP70 expression at week 3, while IL1β expression declined from week 3 to week 6 ($P< 0.05$), indicating changes in inflammatory responses. In summary, a high inclusion of hydroponic BS in dairy goat diets reduced feed intake and milk yield but enhanced the digestibility of organic matter and energy. The increased HSP70 expression implies that bioactive compounds in sprouts may influence metabolism and immunity, highlighting both the potential benefits and limitations of this feed.

Key words: Dairy goat; hydroponic barley sprouts; feed intake; milk yield; immune response

POSTER Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 333

Creating genetic tests aimed at detecting hereditary xanthinuria in domestic dog (Canis lupus familiaris)

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Xanthinuria is a metabolic disorder involving the inability of the body to metabolize xanthine and hypoxanthine, which are byproducts of purine degradation and metabolism of other purine-based compounds, e.g., caffeine, diprophylline. The disease has two major types: type one, related to the XDH gene (responsible for xanthine dehydrogenase and xanthine oxidase enzymes) and type two, related to the MOCOS gene (responsible for molybdenum cofactor sulfurase). The symptoms include accumulation of xanthine and hypoxanthine, leading to kidney stones, hematuria, hyperuricosuria, and, in rare cases, kidney failure, arthropathyormyopathy. Current treatments rely only on preventative measures.

The aim of this investigation was to design a straightforward molecular diagnostic test for canine hereditary xanthinuria. The test focused on four known pathogenic alleles: one variant of XDH: c.654G>A, resulting in exon 8 skipping, and three variants ofMOCOS: c.383del causing a frameshift and premature STOP codon; c.137T>C causing a missense mutation and an inactive protein; and c.232G>T resulting in skipping of exon 2 (Tate et al., 2021).

Mutated alleles were reconstructed in silico based on study's descriptions. Primers were designed with the goal of allowing differentiation of wild-type and mutated alleles using Primer3,ThermoFisher'sMultiplePrimer Analyzer and reverse-complement.com tools. Created primers produce amplicons of distinct lengths. Due to the lack of appropriate restriction enzyme for the MOCOS c.137T>C variant, a molecular probe assay was developed as analternative. Primers' specificity was then evaluated against the complete Canis lupus familiaris reference genome, using NCBI Primer-BLAST.

In silico validation confirmed that the designed primer sets are highly specific, with no off-target binding sites detected across the canine genome. The calculated amplicon lengths align precisely with predictions. This ensures clear differentiation between wild-type and mutated alleles. The designed primers are now ready for laboratory testing and future use in veterinary diagnostics.

POSTER Animal Sciences · SGGW - Warsaw University of Life Sciences, Poland · ID 216

Does chronic polyethylene microplastic exposure affect the dynamics of egg quality during laying in Japanese quail?

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Microplastic pollution is an emerging concern for animal health, including reproduction. While general toxicity is documented, its effects on avian egg quality remain poorly understood. This study aimed to determine whether chronic exposure to polyethylene microplastics (MP) modifies egg quality traits in Japanese quail (*Coturnix japonica*) during the laying period. Female birds at the age of 5 weeks were assigned to a control group or an experimental group exposed to polyethylene MP in drinking water, *ad libitum* (1 mg/L; particle size less than 60 µm). Eggs were collected and analysed at weeks 3, 6 and 9 of the experiment. External and internal egg quality traits were assessed, including egg weight, egg dimensions, yolk and albumen characteristics, shell traits, yolk index and Haugh unit. Data were evaluated using statistical models to assess the effects of treatment, time, and their interaction. Chronic MP exposure did not markedly affect egg weight or most external egg traits. However, internal egg quality parameters showed treatment-dependent changes over time. In the control group, yolk height, albumen height and Haugh unit declined between weeks 3 and 9, indicating a decrease in internal egg quality. In MP-exposed birds, this decline was less pronounced. A significant treatment and time interaction was observed for albumen height, yolk height and Haugh unit, suggesting that MP exposure altered the dynamic patterns of internal egg quality over time rather than causing a simple overall deterioration. These preliminary results indicate that chronic exposure to polyethylene microplastics may modify dynamics of egg quality in Japanese quail. Internal egg quality traits, particularly albumen height and Haugh unit, may therefore serve as sensitive markers for tracking reproductive responses to microplastic exposure in avian models.

POSTER Animal Sciences · NMBU - Norwegian University of Life Sciences · ID 108

Heritabilities of Nitrogen Use Efficiency and Nitrogen Loss for Norwegian Red cows vary over the course of lactation

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Norwegian University of Life Sciences

Environmental and economic pressures to reduce nitrogen surplus in livestock are increasing. Although genetic variability in nitrogen use efficiency (NUE) has been noted, the partitioning of phenotypic variance into its causal components throughout the lactation cycle in Norwegian Red cows (NRF) has not been explored. This study estimated genetic variance in NUE and in changes in nitrogen loss (NL) throughout lactation, and their genetic correlation. Data were collected from 1,932 NRF cows across 16 herds in Norway. NUE is defined as the percentage of dietary nitrogen intake recovered in milk output, while NL is nitrogen intake minus nitrogen output in milk, expressed as kg/day.

The average NUE was 30.41% (±5.77), with an NL of 0.37 kg/day (±0.08) and a phenotypic correlation of -0.46. A random regression (RR) animal model assessed genetic variability across lactation, incorporating Herd-Year-Season, parity, and days in milk (DIM). Pedigree data from 4,957,544 records were refined to the last five generations (8,950 animals) for the additive relationship matrix. Results indicated that the heritability of NUE decreased from 0.33 (SE = 0.037) at 5 DIM to 0.21 (SE = 0.033) at 30 DIM, fluctuating between 0.10 and 0.22 until 320 DIM, then rising to 0.33 (SE = 0.049) at 346 DIM. NL heritability ranged from 0.07 (SE = 0.009) to 0.17 (SE = 0.03) between 20 and 300 DIM, increasing to 0.49 (SE = 0.03) at 340 DIM. The genetic correlation (rG) was calculated by a bivariate repeatability animal model, estimating an overall rG = -0.571 (SE = 0.137), alongside three stage-specific estimates across three DIM ranges: 5–120 days (rG = -0.66 ± 0.20), 121–240 days (-0.15 ± 0.22), and 241–346 days (-0.31 ± 0.46). These findings suggest potential for selective breeding improvements in NUE and NL in NRF cows.

POSTER Animal Sciences · HUJI - Hebrew University of Jerusalem · ID 142

Effects of Incubation Temperature on Functional and Mechanical Properties of Bovine Mammary Epithelial Cells

Galia Liberman

Environmental temperature can substantially influence cellular behavior in culture, including biomechanical and functional properties. In mammary epithelial cells, these properties may directly affect milk component production and secretion. Understanding the influence of temperature on bovine mammary cell cultures may therefore contribute to the optimization of cultured milk production systems.

In this study, bovine mammary epithelial cells were cultured under different incubation temperatures and compared to the standard culture condition of 37°C. Preliminary experiments focused on comparing 37°C and 39°C to evaluate the effects of mild temperature elevation on cellular behavior and milk-related functions.

Cell proliferation and viability were assessed under both conditions. Repeated experiments demonstrated that cells cultured at 39°C exhibited a slower proliferation rate compared to cells maintained at 37°C. In parallel, functional characteristics associated with milk production were examined. Lipid droplet formation was evaluated using BODIPY fluorescent staining and fluorescence microscopy in both regular growth medium and differentiation medium. Qualitative observations from several independent experiments suggested increased lipid droplet accumulation in cells cultured at 39°C.

In addition, cell motility was analyzed using a scratch assay. Cells incubated at 39°C displayed faster migration compared to cells cultured at 37°C.

These preliminary findings indicate that relatively small changes in incubation temperature may substantially alter proliferation, migration, and lipid-related functions of bovine mammary epithelial cells. Further investigation of the mechanical and functional responses of these cells to temperature may help identify optimal culture

POSTER Animal Sciences · HUJI - Hebrew University of Jerusalem · ID 49

Mechanical Compression Induces Irreversible Damage in Bovine Mammary Gland Cell Spheroids

Ilana Bluband

Milking exposes the bovine mammary gland to repeated mechanical forces that may affect tissue integrity and cellular function. The mammary microenvironment, including cell matrix interactions and extracellular matrix organization, plays an important role in maintaining epithelial structure and tissue homeostasis. While the effects of biochemical factors on mammary tissue have been extensively studied, less is known about how mechanical forces contribute to tissue damage and recovery.

The aim of this study was to investigate how compression and shear forces affect the integrity, mechanical behavior, and recovery capacity of bovine mammary gland cells cultured as three-dimensional spheroids.

Bovine mammary gland epithelial cells were cultured as multicellular spheroids and exposed to controlled mechanical loading using a MicroTester system. The experimental setup was designed to simulate mechanical conditions that may occur during milking by applying compression alone or in combination with shear forces. Computational methods were developed to quantify morphological and mechanical changes using image analysis and force displacement measurements.

A series of experiments was performed to evaluate the response of spheroids to acute and sustained mechanical loading under different conditions. Several parameters were examined, including recovery following force release, structural changes during force application, elasticity, proliferation, and fat globule formation as an indicator of cellular functionality. The results showed that excessive mechanical loading can induce irreversible morphological changes in mammary gland spheroids, suggesting that the tissue may not fully recover following repeated mechanical stress. In addition, combined compression and shear loading produced responses that differed from those observed under compression alone.

This research may improve our understanding of how mechanical forces influence mammary gland tissue integrity and could contribute to the development of milking practices that minimize tissue damage. Furthermore, incorporating biomechanical factors into cell culture models may improve the physiological relevance of in vitro systems used in agricultural and biomedical research.

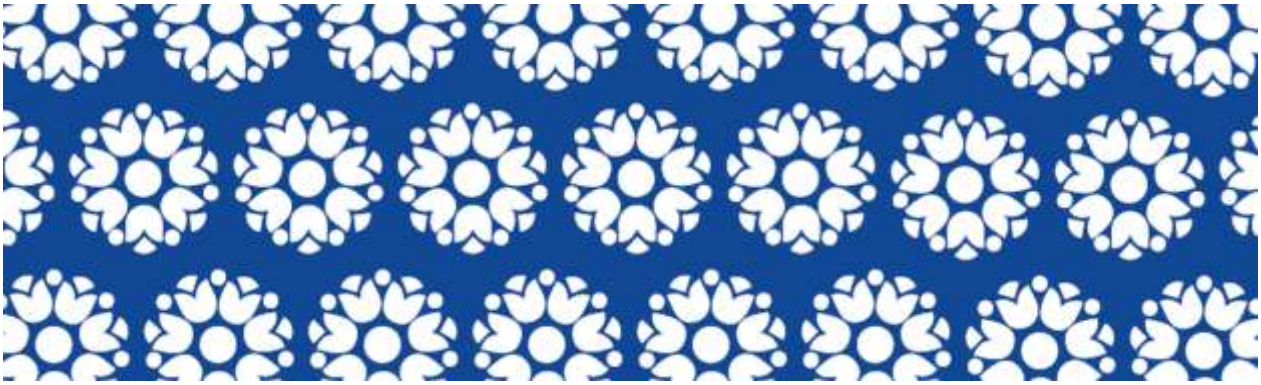
POSTER Animal Sciences · SLU - Swedish University of Agricultural Sciences · ID 79

Small Pellets, Big Differences? A Study on Concentrate Feed and Feeding Time in Horses

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The horse is a grazing animal whose natural behaviour involves prolonged and continuous feed intake, with a large proportion of the day spent chewing and processing forage. In modern housing systems, horses are often fed energy-dense concentrate feeds in pelleted form, which may result in a faster feed intake and reduced feeding time. This, in turn, may affect both physiological functions and the horse's ability to perform natural behaviours. The aim of the present study was to investigate how different types of concentrate feed, including variations in pellet size and manipulation through the addition of chopped lucerne or water, influence feeding time in horses.

The study was conducted as a cross-over trial using a Latin square design, in which six horses were exposed to four different feed types over a 12-day period. Feeding time was recorded at each feeding occasion and standardised to minutes per kilogram of feed to enable comparisons between treatments with different feed allowances. Data were analysed using linear mixed model. The results showed no difference in feeding time between pellet size, whereas adding chopped lucerne prolonged the eating time, and soaking of the pellets shortened the eating time. The findings also contributed to an increased understanding of how diets containing concentrate feeds can be designed to promote longer feeding times and thereby better mimic the horse's natural feeding behaviour. This may have implications for both equine welfare and practical feeding management in stable environments. The conclusion of the study was that feeding time for concentrate feeds could be prolonged or shortened through manipulation of the feed allowance. However, the magnitude of these differences is relatively small. This suggests that adjustments to the physical form of concentrate feeds have limited importance in relation to more decisive factors influencing the horse's physiological and behavioural needs.



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ORAL Biology · SLU - Swedish University of Agricultural Sciences · ID 220

Genetic characterization of the t(6;29) translocation and its association with gonadal hypoplasia in swedish mountain cattle.

Michela Martina Sozzi

Swedish mountain cattle, or Fjällko, are known for their striking white coats with colored patches on the sides. For generations, breeders have selected for this look. Unfortunately, that same selection has accidentally spread a hidden problem: a recessive disorder called gonadal hypoplasia, where the reproductive organs fail to develop properly, leading to poor fertility.

Previous studies linked both the color-sided appearance and the hypoplasia condition to a reciprocal translocation between chromosomes 6 and 29, t(6;29). The Cs29 allele represents the part of chromosome 29 moved to chromosome 6. However, a direct statistical link between carrying two copies of Cs29 and developing hypoplasia had not been established.

This study aimed to confirm the molecular breakpoints of the t(6;29) translocation in Swedish mountain cattle and related breeds, and to test whether Cs29 homozygosity is statistically associated with gonadal hypoplasia. DNA from 29 animals across four Swedish breeds was analyzed using targeted sequencing of three breakpoint regions. Fertility and hypoplasia records were only available for the Fjällko breed, on which Fisher's exact tests were performed.

The results showed that all four breeds shared the same breakpoint sequences, suggesting a common ancestral origin. Statistical analysis revealed a strong association: among animals with confirmed hypoplasia, five out of six were homozygous for Cs29, whereas only one out of fourteen healthy animals carried this genotype. Including animals with fertility problems further strengthened the association. In contrast, the reciprocal Cs6 allele showed no link to hypoplasia.

These findings provide statistical support linking Cs29 homozygosity to gonadal hypoplasia but do not prove causation. Nevertheless, confirming the breakpoints across breeds enables the development of genetic screening tools to guide breeding decisions and reduce the incidence of this disorder.

ORAL Biology · SLU - Swedish University of Agricultural Sciences · ID 395

Investigating a potential plant growth promotion mechanism of black solider fly larvae frass: the role of siderophore producing Pseudomonads

Leonie Brämer

Converting organic waste into fertilizers is central to the circular economy. Frass, a high-value organic fertilizer derived as a residue from rearing black soldier fly (Hermetia illucens) larvae—has shown promise as a biostimulant, yet the mechanisms behind its plant growth promotion remain unclear. In particular, the role of frass-associated microbial communities is underexplored. This study investigates whether siderophore-producing Pseudomonads, bacteria known to enhance plant iron uptake, contribute to the biostimulant effects of frass.

Three linked studies were conducted. First, pig manure was bioconverted by larvae to produce frass, and phytotoxicity was evaluated using a seed germination assay. Second, a greenhouse experiment was conducted with kale (Brassica oleracea), in which soils were amended with either fresh frass or heat-sterilized frass to separate microbial from nutrient effects and analyse the plant growth. Third, siderophore-producing Pseudomonads were quantified in fresh frass and in the rhizosphere of frass-amended soils using selective isolation on agar, followed by the chrome azurol S assay.

Preliminary findings indicate that siderophore-producing Pseudomonads are present in fresh frass and detectable in the rhizosphere following frass amendment. Kale grown with fresh frass showed greater biomass gains than plants receiving sterilized frass, suggesting that microbial activity, alongside nutrients, contributes to growth responses. While plant growth differences likely reflect multiple factors, these results point to a microbial pathway, potentially mediated by siderophores, through which frass promotes plant growth.

Understanding the biostimulant mechanisms of frass is essential to optimize frass production and application. By identifying microbial functions that underpin plant responses, this work can inform quality controls and management practices, and it offers a pathway to replace part of mineral fertilizer inputs with circular, bio-based alternatives.

ORAL Biology · WUR - Wageningen University & Research, Nederlands · ID 399

Improving Baculovirus Stability Using Natural Deep Eutectic Solvents (NADES)

Gita Amalya Chairinida

Wageningen University and Research

The growing demand for vaccines and therapeutic proteins requires efficient and scalable production systems. The baculovirus expression vector system (BEVS) is a widely used platform that consists of engineered baculovirus and insect cells as vectors for recombinant protein and vaccine production, but its application is limited by the loss of viral infectivity during storage, requiring energy-intensive cold-chain conditions. The large-scale production requires long-term storage of baculovirus under cold-chain conditions, increasing costs and logistical complexity. Natural Deep Eutectic Solvents (NADES) have emerged as green solvents that are sustainable and biocompatible, with potential application in biomolecule stabilization and cryopreservation. This study investigated the potential of NADES to maintain baculovirus viral titer under non-freezing conditions.

Six selected NADES formulations were first evaluated for their compatibility with Sf9 insect cells using cytotoxicity assays. These formulations were then assessed for their ability to stabilize viral titers. All formulations were evaluated through short-term stability and synergy validation studies under accelerated conditions (37 °C). Furthermore, one promising candidate was followed by longer-term storage at refrigerated and room temperatures. In addition, the most promising formulation was evaluated for its potential application in insect cell cryopreservation.

NADES formulations were compatible with Sf9 cells at low concentrations and showed improved baculovirus stability compared with untreated controls. Although viral infectivity still declined during storage overtime, selected formulations showed reduced infectivity loss under both accelerated and long-term storage conditions. Furthermore, one formulation demonstrated compatibility with Sf9 cell cryopreservation, indicating potential beyond virus stabilization.

This study demonstrated that NADES have the potential to improve baculovirus storage under conditions without freezing. However, further studies and optimization are needed. Overall, these findings contribute to the development of more efficient and more sustainable bioprocesses for viral stock preservation and biopharmaceutical production.

ORAL Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 326

Toxicological analysis of Latarcin-1 in the context of safety of use in aquatic ecosystems

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For years, scientists have been looking for new sources of chemical substances, that can be used in various areas of our lives. Very often they look for them in the nature surrounding us. One of the increasingly popular sources of such substances are animal venoms. Among them, spiders constitute a very important group. One of the representatives of this group is the spider *Lachesana tarabaevi*, which possesses the toxin Latarcin-1 in its venom. This toxin has cytotoxic potential associated with destabilization of cell membranes. Currently, it has been shown to have cytotoxic effects on some bacteria, yeasts and cancer lines. However, there is a lack of research on other organisms, especially eukaryotes. One of them are single-celled algae, e.g. Prymnesium parvum, whose blooms pose a threat to the natural environment. This work is a fragment of research on Latarcin-1 as a potential algaecide/alganostatic agent. As part of these studies, cytotoxicity tests were performed on the L-929 cell line, and on the unicellular algae *Acutodesmus obliguus*. The obtained results indicate that Latarcin-1 at the concentrations used does not have cytotoxic effects on L929 cells, but inhibits the development of unicellular algae. This is the first step confirming the potential of Latarcin-1 as an algaecide or algaestatic agent.

ORAL Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 320

Analysis of mutations in the AR gene causing AIS in the house mouse (Mus musculus) as a translational model for humans (Homo sapiens) – an in silico study.

Nina Smak

Testosterone and 5α-dihydrotestosterone (DHT) are the primary androgens mediating male sexual development via the intracellular androgen receptor (AR). A mutation in the X chromosome within the *AR* gene causes androgen insensitivity syndrome (AIS), which ranges from complete (cAIS) to partial (pAIS) forms and is biochemically classified by receptor status (AR+, AR-, AR±). Mouse models replicate human cAIS phenotypes, such as infertility or cryptorchidism. The aim of this study was to present a comparative structural *in silico* analysis of the mutated receptors of both species.

The study used three complementary bioinformatics tools. First, NCBI BLASTp, to evaluate the evolutionary conservation of the mutation site. Next, 3D structural analysis via Project HOPE assessed the mutation's impact on ligand binding, followed by interaction network analysis in STRING v.12.

Regarding sequence alignment, high evolutionary homology between receptors of the two species (E-Value: 0.0 and 89% sequence identity) proved that the target mutation site is 100% conserved. Structural analysis of human (Arg753Cys) and mouse (Arg754Cys) mutations within the ligand-binding domain (PDB:8E1A) revealed that this arginine-to-cysteine substitution causes severe physicochemical damage in both species and completely blocks the downstream signaling pathway. Ultimately, proof of molecular equivalence lies in the conserved functional interactions with key cellular components, including chaperones Hsp90aa1 and Hsp90ab1, which exhibit a significant co-expression score of 0.846 in *Mus musculus*. This correlation is vital for retaining receptor stability and high ligand-binding affinity. Subsequent to activation and translocation, Ezh2 mediates chromatin epigenetic modifications, crucial for binding the AR gene to appropriate androgen response elements.

By demonstrating these molecular mechanisms, the study established a direct link between structural damage and the clinical AIS phenotype. Crucially, demonstrating this interspecies homology validates the predictive power of the mouse model, supporting its use in future translational diagnostics and therapeutics.

ORAL Biology · HUJI - Hebrew University of Jerusalem · ID 235

Virus-Induced Genome Editing: Improving Efficiency and Developing Reliable Markers in Solanaceae Crops

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CRISPR-based genome editing has become a powerful tool for crop

improvement. However, its application in many crop species remains

constrained by the need for tissue-culture-based regeneration, particularly in crops such as pepper that exhibit low regeneration efficiency.

Virus-Induced Genome Editing (VIGE) offers a promising alternative by using plant viruses to deliver sgRNAs into Cas9-expressing plants, enabling genome editing directly in planta. Despite recent advances, the practical implementation of VIGE remains limited by two major challenges: low heritable editing efficiency and the lack of reliable markers for monitoring editing events.

In this study, a Tobacco rattle virus (TRV)-based VIGE knockout system is

being evaluated in tomato and pepper.

Using specific pruning strategies, we obtain progeny carrying edits in the PDS gene in both tomato (Solanum lycopersicum) and pepper (Capsicum

annuum). Although the disruption of PDS produces easily detectable white

tissues and albino progeny, it can severely impair plant development, creating the need for alternative markers. To address this, we evaluate a transgenic pepper line overexpressing Anthocyanin 2 (AN2), a regulator of anthocyanin pigment production. Editing of the AN2 transgene results in a clear visual somatic phenotype, without disturbing plant development.

To uncover optimized pepper genotypes for VIGE, we screened 50 pepper

genotypes from the G2P collection for TRV susceptibility. This analysis

revealed substantial variation in susceptibility to TRV infection, suggesting that host genotype may strongly influence the efficiency of TRV-based genome editing.

Together, these approaches support the development of more efficient and reliable tissue-culture-free genome editing systems in

Solanaceae crops.

ORAL Biology · BOKU University, Austria · ID 121

Identifying the protein interactors of WAV3, an E3 ubiquitin ligase that controls root growth in Arabidopsis

Pias Roy, Christian Luschnig, Linh Ta Thi Thuy, Sravankumar Thula

Directional root growth in Arabidopsis is governed by the WAV3 family of RING-finger E3 ubiquitin ligases, WAV3, WAVH1, and WAVH2, which act at the root-tip plasma membrane to control gravitropism and the polar localization of the auxin efflux carrier PIN2. How these ligases operate at the molecular level remains unclear, because their direct protein partners and substrates are still largely unknown. My thesis set out to identify and validate the protein interactors of WAV3 in roots.

Starting from candidate partners that emerged from proximity-labeling proteomics, filtered against a mislocalized, non-functional WAV3 variant and an unrelated membrane control to remove background, I generated a broad set of Gateway-based constructs: yeast two-hybrid baits and preys, fluorescent-protein fusions, and epitope-tagged versions for biochemistry. The candidates were first screened by yeast two-hybrid. The WAV3 bait, however, drove strong autoactivation across an unusually diverse panel of partners, leaving this assay uninformative for WAV3, in itself an instructive result. I therefore established complementary, orthogonal approaches. In Nicotiana benthamiana, Venus-tagged WAV3 reproduces its plant-like localization, and a subset of candidates show partial co-localization, while GST- and FLAG-based pull-down assays are being optimized to capture direct interactions.

Together, this work delivers a validated molecular toolkit and a robust, multi-method pipeline for mapping the WAV3 interactome, a first step toward understanding how these E3 ligases steer auxin transport and root growth.

ORAL Biology · L'Institut Agro, France · ID 331

Investigation of DNA and RNA Bacteriophages carrying Antibiotic Resistance Genes in organic waste matrices

Louis Dao

Since antibiotic's invention, scientists are concerned about appearance of antibiotic-resistant bacteria. Genetic exchange within bacterial communities promotes the emergence of antibiotic resistance, and bacteriophages, or phages, are involved in these exchanges via transduction. The research issue is to investigate and study RNA- or DNA-based phages carrying antibiotic resistance genes (ARGs) in various matrices like soil and organic amendments, with or without induction of the lytic phase by mitomycin C.

The first step is to identify and quantify the phages carrying these specific resistance genes (tetA, tetM, ctxM1, sul1, and sul2) in various matrices derived from the anaerobic digestion of organic waste. For the methodology, the Qubit method is used first to measure nucleic acid concentrations based on specific fluorescent dyes. Next, droplet digital PCR (ddPCR) is used to analyse the concentration of specific DNA. This technique combines PCR and flow cytometry. The sample is emulsified with oil to generate several thousand independent droplets, which are subjected to standard PCR cycles, and the number of positive droplets is assessed by the flow cytometry system. For RNA phages, a reverse transcription step (RT-ddPCR) is performed.

The experiments confirmed the presence and absolute quantification of DNA phages carrying ARGs in the anaerobic digestate samples. However, data from the RNA phage analysis showed a technical limitation. A persistent residual DNA contamination appeared even without the reverse transcription step. This result indicates that the DNase treatment was not effective. To address this issue, future experiments need to increase the initial sample size, by extracting from 20 grams of soil instead of 2 grams, for example.

ORAL Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 25

Physiological adaptation of Yarrowia lipolytica to spent coffee grounds and plant-derived lipid substrates in food side-stream valorisation

Aleksandra Piotrowicz

The food industry generates large amounts of lipid- and phenolic-rich by-products, including spent coffee grounds, which remain underutilised despite their potential as substrates for microbial bioconversion. Oleaginous yeasts such as Yarrowia lipolytica can convert hydrophobic and plant-derived substrates into biomass and lipid-derived metabolites, but their performance depends on their ability to adapt to inhibitory compounds and processing-related stresses.

This study evaluated the growth response and tolerance of Y. lipolytica cultivated on conventional and unconventional media differing in chemical complexity and potential inhibitory load. Particular attention was given to spent coffee grounds as a food-processing side stream containing residual caffeine and phenolic compounds, and to plant-derived lipid substrates, including blackcurrant seeds, hemp oil, and poppy seed oil.

Cultivations were performed as aerobic shaken cultures in liquid media supplemented with the tested carbon sources. Growth behaviour and biomass formation were compared across media, while dry biomass concentration was determined gravimetrically after centrifugation, washing, and drying of culture pellets. Emulsifying activity of cell-free culture supernatants was determined according to the method of Cirigliano and Carman as a phenotypic indicator of extracellular bioemulsifier-like activity associated with growth on hydrophobic or chemically complex substrates. From a food science perspective, these responses are relevant because they indicate whether low-value side streams can support stable yeast growth while simultaneously promoting functional extracellular metabolites. Linking biomass formation with emulsifying activity provides a practical basis for selecting substrates suitable for sustainable fermentation and future development of yeast-based ingredients or bioprocessing strategies.

The tested substrates induced substrate-dependent differences in biomass formation and emulsifying activity, suggesting distinct physiological strategies related to lipid assimilation, tolerance to inhibitory compounds, and extracellular emulsifier production. These findings support the use of Y. lipolytica for studying microbial adaptation and valorisation of complex food-processing side streams.

POSTER Biology · University of Lleida, Spain · ID 304

Replacement of sulfuric acid by chlorotrimethylsilane in the determination of poly(3-hydroxybutyrate) by GC-MS

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Polyhydroxyalkanoates (PHAs) are polyesters formed by the linking of various hydroxyalkanoates and are biosynthesized by a multitude of microorganisms. They are accumulated intracellularly as a carbon and energy reserve under nutrient imbalance conditions, such as nitrogen or phosphorus deficiency. PHAs are regarded as valuable bioplastics due to their promising characteristics which include biodegradability, biocompatibility, and non-toxicity. The most widely studied PHA is poly(3-hydroxybutyrate) (PHB) and the most extensively used analytical method for its determination is acid methanolysis followed by analysis through gas chromatography, in which intracellular PHB is converted into methyl 3-hydroxybutyrate. Chlorotrimethylsilane has already been used as an acidic catalyst for the determination of fatty acids, suggesting its potential applicability to PHB methanolysis. In the present study, the suitability of chlorotrimethylsilane as an acidic catalyst was evaluated for the determination of PHB produced by the halophilic bacterium Halomonas elongata 1H9 under non-sterile bioreactor conditions. An alternative method was developed after the optimisation of time, temperature, and volumes of chlorotrimethylsilane, methanol, and chloroform. The proposed method was validated in terms of accuracy, precision, and linearity. The developed procedure reduced solvent consumption and shortened the derivatization time while maintaining satisfactory analytical performance. The obtained results demonstrated the suitability of the method for PHB quantification in bacterial samples.

POSTER Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 360

Analysis of Doxycycline- and Sulfamethoxazole-Resistant Bacterial Strains in Post-Industrial Wastewater as a Method of Environmental Monitoring

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The phenomenon of antibiotic resistance poses a significant threat to the environment. Current wastewater treatment methods do not eliminate antibiotics completely, which may create conditions suitable for the selection of resistant bacteria. Moreover, resistance genes may persist and spread in aquatic ecosystems despite wastewater treatment. The aim of the project was to analyse the presence and diversity of bacterial strains resistant to sulfamethoxazole and doxycycline in wastewater from the sugar industry.

Due to the high content of organic substances and presence of antibiotics from agricultural sources in flume waters, this type of wastewater may promote the selection of bacteria resistant to the tested antibiotics. However, the role of post-industrial wastewater in spreading antibiotic resistance remains insufficiently understood.

Post-industrial wastewater was collected from a wastewater treatment plant receiving waste from a sugar refinery. The samples were serially diluted and plated on selective microbiological media supplemented with a selected antibiotic at a selective concentration. This enabled the assessment of microbial growth and the selection of strains resistant to sulfamethoxazole and doxycycline. Selected isolates were passaged to obtain pure cultures, and genetic material was isolated. PCR and 16S rRNA gene sequencing were performed to identify the bacteria.

The study confirmed the presence of isolates resistant to sulfamethoxazole and doxycycline in the analysed wastewater. For sulfamethoxazole, 15 isolates were obtained on selective medium, corresponding to 25% of the control sample. These included 7 Gram-positive bacteria, 6 Gram-negative bacteria, and 2 environmental yeasts. The results therefore indicate a diverse composition of microorganisms capable of growing in the presence of sulfamethoxazole Strains resistant to doxycycline were also initially observed, suggesting a similar tendency.

The obtained data may expand knowledge on environmental reservoirs of bacteria resistant to selected antibiotics and indicate the need for biomonitoring of antibiotic resistance in post-industrial wastewater.

POSTER Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 208

Ferritin-mediated iron delivery sensitizes MDA-MB-231 triple-negative breast cancer cells to ferroptosis

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Cancer cells exhibit an increased demand for iron, which supports their proliferation, metabolic activity, and survival. In triple-negative breast cancer (TNBC), represented by the MDA-MB-231 cell line, iron metabolism has emerged as a promising therapeutic target. In parallel, increasing attention has been given to ferroptosis, a regulated form of cell death driven by iron-dependent lipid peroxidation. Exploiting the relationship between iron homeostasis and ferroptosis may provide novel strategies for cancer treatment.

The aim of this study was to determine whether ferritin can function as an effective iron delivery system in MDA-MB-231 cells and whether increased intracellular iron enhances sensitivity to ferroptosis induced by the GPX4 inhibitor ML162. We hypothesized that ferritin-mediated iron uptake increases susceptibility of TNBC cells to ferroptotic cell death.

Ferritin uptake was analyzed using fluorophore-conjugated human ferritin (HFt-AF488). Internalization pathways were examined using the early endosomal marker EEA1 and pharmacological inhibitors of endocytosis, including chlorpromazine and dynasore. Cellular responses to ferritin-derived iron were assessed by measuring transferrin receptor 1 (TfR1) and endogenous ferritin expression. Ferroptosis was induced with ML162, and lipid peroxidation was measured as a key marker of ferroptotic cell death. Ferrostatin-1 was used as a specific inhibitor to confirm ferroptosis involvement.

Our results showed that ferritin undergoes active TfR1-dependent endocytosis and efficiently delivers iron into MDA-MB-231 cells. Ferritin-mediated iron uptake altered TfR1 and endogenous ferritin expression, indicating changes in cellular iron homeostasis. Importantly, increased iron availability significantly sensitized cells to ML162-induced ferroptosis and was associated with enhanced lipid peroxidation. These effects were fully reversed by ferrostatin-1, confirming their ferroptotic nature.

In conclusion, ferritin acts as an efficient iron carrier and enhances ferroptosis sensitivity in TNBC cells. These findings suggest ferritin-mediated iron delivery as a potential therapeutic strategy for targeting triple-negative breast cancer and warrant further investigation in in vivo and translational models.

POSTER Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 207

Green synthesis of gold nanoparticles using milk thistle seed extract and their cytotoxicity toward skin cells

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Gold nanoparticles, due to their unique physicochemical and biological properties, are widely used in medicine and cosmetology. However, the most commonly used chemical and physical synthesis methods are associated with significant limitations, including the generation of toxic waste and environmental pollution. An alternative approach is green synthesis, which relies on natural materials capable of reducing metal ions and stabilizing newly formed nanoparticles. One such material is an extract from milk thistle seeds (lat. Silybum marianum), rich in silymarin. Scientific reports indicate that it is capable of neutralizing reactive oxygen species (ROS) and exhibits anti-inflammatory and immunomodulatory effects. Therefore, its application in green synthesis may potentially enhance the beneficial effects of gold nanoparticles on the skin.

The aim of this study was to evaluate the cytotoxicity of gold nanoparticles obtained via green synthesis using milk thistle seed extract toward skin cells.

Gold nanoparticles were synthesized using milk thistle seed extract and silymarin derived from drug. Their physicochemical properties were characterized by electron microscopy, dynamic light scattering (DLS), nanoparticle tracking analysis (NTA) and UV-Vis spectroscopy. Cytotoxicity was assessed in HaCaT cells treated with different concentrations of the synthesized nanoparticles. Cell morphology was examined using May-Grünwald-Giemsa staining, while metabolic activity was determined using the XTT assay.

The results confirmed the successful green synthesis of gold nanoparticles and their biocompatibility within the tested concentration range.

POSTER Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 286

Microfluidic synthesis of PLGA and PLGA-Dextran Sulfate nanoparticles and their effect on monocyte and endothelial cell lines

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Poly(lactic-co-glycolic) acid (PLGA) nanoparticles are often used for drug delivery, decompose over time, and are well characterized for their non-toxicity. An innovative idea would be to use them as carriers of glycocalyx components, like dextran sulfate (DS), potentially expanding treatment options for diabetic patients. Chronic wounds are common in diabetes, partially due to a degraded glycocalyx in blood vessels. Using PLGA nanoparticles to rebuild this layer would be a major step toward the broader use of nanotechnology in medicine.

A microfluidic system enables the formation of a homogeneous population of nanoparticles, ensuring reproducibility of synthesis conditions. PLGA and PLGA-DS nanoparticles shouldn't negatively impact the viability of monocytes and endothelial cells, and there shouldn't be significant differences between the two types of nanoparticles in cytocompatibility.

The study aimed to: •optimize the method of organic nanoparticles synthesis using a microfluidic system; •investigate the possible differences in cytocompatibility of PLGA and PLGA-DS nanoparticles with monocytes and endothelial cells.

The nanoparticle synthesis method was based on the nanoprecipitation process, using organic and water phases. A microfluidic system comprising two syringe pumps and a microfluidic chip was used to mix two phases.

The cytocompatibility of nanoparticles was checked with XTT and LDH assays on THP-1 (monocytes) and HDBEC (endothelium) cell lines.

The research showed that the microfluidic system, in fact, helped achieve a homogeneous population of both PLGA and PLGA-DS nanoparticles with a diameter of approximately 100 nm. Neither nanoparticle type reduced the viability of monocytes and endothelial cells, as indicated by no significant differences compared to the control group and between the PLGA and PLGA-DS groups.

These initial results reveal the positive outcome of PLGA and PLGA-DS nanoparticles cytocompatibility with monocytes and endothelial cells, providing the possibility of further studies containing more advanced cellular models, such as a chronic wound model.

POSTER Biology · SGGW - Warsaw University of Life Sciences, Poland · ID 318

Comparison of the Coagulation factor XII (F12) pseudogene structure between the beluga whale (Delphinapterus leucas) and selected cetacean species

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One of many genes that has undergone the process of pseudogenization (accumulation of loss-of-function mutations) in cetaceans is the *F12* gene expressed as the coagulation factor XII (FXII). In terrestrial mammals, factor XII plays a role in heamorrhage prevention. In cetaceans the protein is ineffective and potentially harmful during diving. The aim of this study was to compare the structure of the *F12* pseudogene between the beluga whale (*Delphinapterus leucas*), the narwhal (*Monodon monoceros*), closest living terrestrial relative - the hippopotamus (*Hippopotamus amphibius kiboko*) and selected cetacean species - the orca (*Orcinus orca*), common bottlenose dolphin (*Tursiops truncatus*), blue whale (*Balaenoptera musculus*) and common minke whale (*Balaenoptera acutorostrata*).

Using the NCBI database a referential hippopotamus *F12* sequence (RefSeq: XM_057747008.1) was collected for comparison of a functional gene to a cetacean, non-functional pseudogene. BLASTn was used to identify gene orthologs. The UCSC (University of California, Santa Cruz) Genome Browser was used to visualize gene structure. Stop codons were identified and counted using a Python script in Google Colab throughout the exons. A reconstruction of the phylogenetic tree was created using Mega12.

The BLASTn alignment showed 88.72% identity over 37% query coverage between the hippopotamus and beluga. Structural differences in exon organization were observed across species, with the beluga showing 19 exons in UCSC annotations and 16 in NCBI. 16 stop codons and 134 single point mutations were noted for the beluga. The differences are supported by the structure of the phylogenetic tree, which deviates from the accepted phylogeny of the species.

The structure of the *F12* varies greatly across cetacean species, yet conserved regions are still present. The pseudogene is not subject to strong selection. Mutations occur randomly and are not species-specific. Their accumulation means that, despite the preservation of coding sequences (CDS), the gene no longer encodes a functional protein.

POSTER Biology · HUJI - Hebrew University of Jerusalem · ID 255

Implementing a produce prescription program for adults with type 2 diabetes in Jerusalem: a pilot evaluation

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Hebrew University

Unhealthy diets and nutrition insecurity significantly drive the global epidemic of type 2 diabetes, placing an unsustainable economic burden on healthcare systems. In response, "Food is Medicine" interventions, specifically Produce Prescription Programs (PPRs), have emerged as a promising strategy. These programs allow healthcare providers to prescribe fresh fruits and vegetables to vulnerable populations. While evidence from the United States suggests PPRs can improve blood sugar control and reduce food insecurity, significant knowledge gaps remain regarding their generalizability to different international healthcare structures, their underlying causal mechanisms, and the precise cultural or organizational adaptations required for successful implementation.

This study evaluates the feasibility, acceptability, and implementation of a novel PPR intervention targeting low-income adults with type 2 diabetes within a managed community healthcare setting in Jerusalem. Utilizing fresh produce rescued from agricultural surpluses via a national food bank, the program integrates weekly produce deliveries with targeted nutrition and cooking education led by clinical dietitians.

This master's thesis focuses on a one-month pilot phase and the qualitative implementation outcomes of a larger randomized controlled trial. Using a mixed-methods approach, semistructured interviews will be conducted with approximately fifteen institutional stakeholders—including representatives from ministries, health management organizations, and food banks—and thirty program participants. Thematic analysis will be applied to identify key structural facilitators and barriers to integrating PPRs into routine clinical care, alongside exploring patient-perceived benefits regarding nutrition security and diabetes self-management.

Ultimately, this pilot evaluation provides crucial insights into the organizational adjustments needed to execute culturally sensitive nutrition programs. By evaluating an intervention at the intersection of public health and agricultural surplus rescue, this research helps build a foundation for scalable, sustainable policies that effectively link food systems to healthcare economies to protect underserved populations.

POSTER Biology · L'Institut Agro, France · ID 315

From Curd to Curves: How the MATLAB Drop-IT! script transforms raw interfractal and dilational tensiometry data into functional signatures of caseins.

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The interfacial properties of milk proteins play a key role in the functionality of dairy products, particularly in processed cheese systems, where emulsifying salts modify casein functionality and interfacial behavior. Understanding these mechanisms requires accurate characterization of adsorption and interfacial rheological properties. However, data processing is highly time-consuming, as advanced kinetic analyses and rheological visualizations are required.

To address these limitations, Drop-IT was developed as a MATLAB (R2021b) script for the automated processing of data exported from drop tensiometer experiments in .csv and .xlsx formats. The script imports experimental parameters, performs automated data cleaning, detects oscillation amplitudes using a dedicated signal-processing routine, and generates adsorption kinetics, frequency sweep, amplitude sweep, and Lissajous representations. All calculated parameters are automatically exported to structured Excel files. Once the raw files are collected, the complete processing workflow requires less than five minutes.

Drop-IT was validated using previously published datasets and showed no statistically significant differences from proprietary software calculations for the determination of the dilatational modulus and elastic modulus during frequency sweep experiments (Welch's t-test, $p > 0.05$). In addition to reproducing routine calculations, Drop-IT substantially extends and speeds up the analytical capabilities available to users.

Currently, the script is being applied to investigate the interfacial behavior of calcium paracaseinate systems in the presence of emulsifying salts. The primary objective is to better understand the mechanisms by which these additives modify protein functionality, thereby supporting strategies to reduce or replace emulsifying salts in processed cheese formulations. Ultimately, Drop-IT is designed to be a versatile tool applicable to various protein systems; for instance, it will be used to evaluate the impact of processing treatments on the functionality of plant-based proteins, accelerating the development of more sustainable food products.

POSTER Biology · WUR - Wageningen University & Research, Nederlands · ID 198

Temporal Dynamics of Oxidative Stress, Antioxidant Responses, Chlorophyll Degradation and the Carotenoid Paradox in Tomatoes Under Controlled Oxygen During Cold Postharvest Storage

Dagim Assefa

Tomatoes(Solanum lycopersicum) are highly valued horticultural crops whose postharvest quality is frequently compromised by chilling injury during cold storage, leading to biochemical alterations including the accumulation of reactive oxygen species(ROS), unstable molecules that damage cell membranes and degrade pigments and changes in lycopene, the pigment responsible for the characteristic red colour of ripe tomatoes. While low oxygen storage has been reported to preserve lycopene and support red colour development during shelf life after cold storage, the biochemical mechanisms underlying this effect remain poorly understood. This study investigates the temporal dynamics of oxidative stress, antioxidant defence, chlorophyll degradation, and carotenoid metabolism in mature green and ripe tomatoes stored at 4°C under two oxygen concentrations, low oxygen(5 kPa) and normal oxygen(21 kPa), for two weeks, followed by recovery at room temperature to simulate shelf life conditions up to nine days. Samples collected at multiple time points were analyzed for ROS species including hydrogen peroxide(H_2O_2) and malondialdehyde(MDA), enzymatic antioxidants(superoxide dismutase, catalase, and ascorbate peroxidase), non-enzymatic antioxidants including carotenoids and lycopene, and total chlorophyll content. Results revealed that in ripe tomatoes, low oxygen significantly reduced H_2O_2 accumulation while simultaneously maintaining higher carotenoid content compared to normal oxygen, which paradoxically showed both elevated H_2O_2 and lower carotenoid content despite greater oxygen availability for biosynthesis. In mature green tomatoes, neither H_2O_2 nor carotenoid content differed significantly between oxygen treatments, suggesting a fundamentally different oxidative stress mechanism driven by photosystem-II activity rather than mitochondrial respiration. Furthermore, MDA was governed primarily by maturity stage and storage-time rather than oxygen treatment, declining in mature green tomatoes as chlorophyll degraded and increasing in ripe tomatoes as senescence progressed. The effect of antioxidant enzymes, and also whether the lower carotenoid under normal oxygen reflects accelerated enzymatic degradation or suppressed biosynthesis is currently under investigation and will be presented at the conference.

POSTER Biology · EMU - Estonian University of Life Sciences · ID 47

Antimicrobial resistance in European wildlife: resistance genes, mobile elements, and the Baltic surveillance gap

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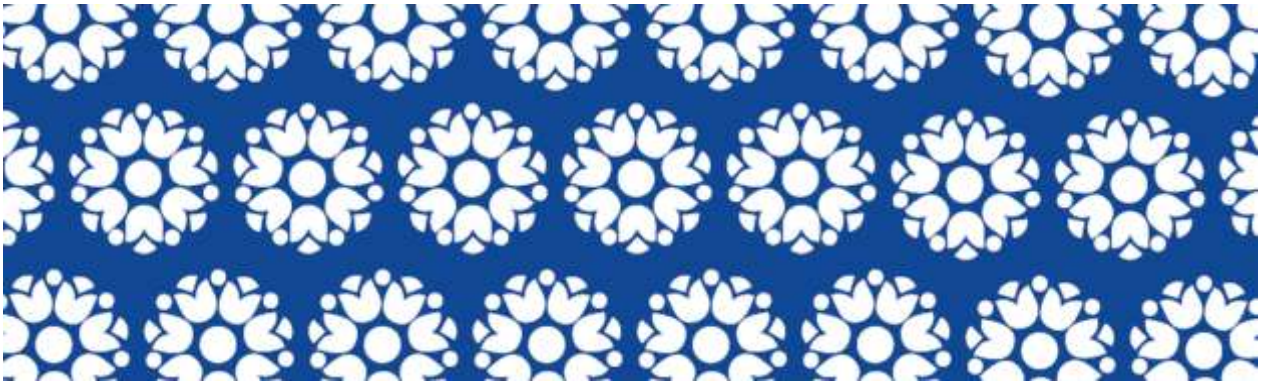
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Antimicrobial resistance (AMR) is recognised as an ecological problem that connects hospitals, farms, and wild environments. European wildlife, particularly gulls, wild boar, hedgehogs, and marine mammals, carries clinically important AMR bacteria acquired from human-impacted habitats. Mobile genetic elements (MGEs) are known as the primary vehicles for the spread of resistance. Despite growing evidence across Western and Northern Europe, the Baltic region remains a critical surveillance blind spot within a key migratory flyway.

The current review synthesised from 87 publications (January 2000 to April 2026) on AMR in European wildlife. Evidence was organised in four resistance categories: extended-spectrum beta-lactamase (ESBL) and AmpC-producing Enterobacterales, methicillin-resistant Staphylococcus aureus (MRSA), carbapenemase-producing Enterobacterales (CPE), and ESKAPE (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter spp.) pathogens. Resistance genes, plasmids, and bacterial sequence types were extracted to assess molecular overlap with clinical and environmental isolates.

Across taxa, dominant ESBL genes were blaCTX-M-1, blaCTX-M-15, blaSHV-12, and blaCMY-2, carried on IncF, IncI1, IncHI2, and IncX3 plasmids, also prevalent in humans and livestock. CPE detected in gulls and storks included blaOXA-48, blaOXA-181, blaNDM, blaKPC, blaVIM, and blaGES-5. Colistin resistance gene mcr-1 on an IncI2 plasmid was first detected in European wildlife in a Lithuanian migratory gull. A Lithuanian wild bird survey identified multidrug-resistant Escherichia coli in 33.5% of samples. mecC-MRSA (CC130, CC1943) in hedgehogs represents the only confirmed wildlife reservoir rather than spillover. Estonia and Latvia have no equivalent wildlife AMR data, leaving the eastern Baltic coast entirely uncharacterised.

European wildlife carries a clinically relevant AMR gene pool dominated by shared MGEs linking animals, wastewater, and human medicine. The absence of systematic wildlife AMR surveillance in Estonia represents a significant gap in a migratory corridor with direct connections to well-studied European and Scandinavian populations. Establishing baseline surveillance in the Baltic states is a One Health priority.



TRACK

Food sciences

Eat something ELLS - Innovations from crops to plate

19 abstracts · 9 oral presentations · 10 posters

ORAL Food sciences · L'Institut Agro, France · ID 159

Bolus formation of oat pancakes and peanut butter: Development of an in vitro mastication protocol

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The oral phase is the first stage of digestion, with a mastication step that strongly influences bolus formation prior to gastric digestion. Food matrix properties can affect chewing behaviour, saliva incorporation and particle breakdown, particularly for solid foods. However, bolus formation and properties remain insufficiently characterised in in vitro digestion studies of solid foods. The aim of this study was to characterise the in vivo oral processing behaviour of oat pancake (Pan) , peanut butter (PB), and their combination (Pan+PB), to further develop a biologically relevant mastication protocol for in vitro studies. Saliva uptake and particle size distributions of the boluses collected from participants (n=2 adults) were measured. Based on these results, an in vitro mastication protocol was developed using a Stomacher® to reproduce the breakdown and hydration level observed in vivo. Different treatment times were tested to identify conditions that best matched the physical characteristics of each bolus. The results showed that the food matrix significantly influenced oral processing. Saliva incorporation varied between food products, while particle size analysis revealed different levels of food breakdown after mastication. These findings enabled the definition of product-specific hydration levels and Stomacher® treatment times to mimic in vivo mastication. This preliminary study provides a first step towards improving the oral phase of in vitro digestion models. The findings highlight the importance of understanding food matrix properties and their relation with changes in the oral cavity to better represent physiological mastication.

ORAL Food sciences · WUR - Wageningen University & Research, Nederlands · ID 130

When iron intake is not enough: Modelling iron adequacy in Malawian adolescent girls

Sonja König

Background: Adolescent girls are at high risk of iron deficiency due to increased requirements for growth and iron losses through menstruation. In sub-Saharan Africa, diets are predominantly plant-based and high in phytate, while low in heme iron, resulting in poor iron bioavailability. Consequently, total dietary iron intake may not accurately reflect whether physiological iron requirements are met.

Objective: To evaluate whether habitual dietary iron intake meets physiological iron requirements among adolescent girls in Malawi after accounting for iron bioavailability and menstrual losses.

Methods: The study included 60 adolescent girls aged 15–20 years participating in the SPIRIT study in Zomba, Malawi. Habitual iron intake was estimated from repeated dietary assessments using food-weighing records, 24-hour recalls, and food frequency questionnaires. Iron bioavailability was predicted using established diet-based algorithms. Menstrual iron losses were quantified from menstrual blood loss data using the alkaline hematin method. Finally, absorbed iron intake was compared with European Food Safety Authority (EFSA) requirements, and the probability of iron adequacy was estimated.

Results: Mean habitual iron intake was 20.8 mg/day, exceeding EFSA reference intakes. However, iron bioavailability was very low at 2.9%, resulting in a mean absorbed iron intake of only 0.6 mg/day, well below the EFSA requirement of 1.13 mg/day. Mean menstrual iron loss was 15.7 mg per cycle (0.56 mg/day), substantially higher than EFSA assumptions. Based on a probability approach, only 18.4% of participants achieved adequate iron intake, while 54.2% were anaemic at baseline.

Conclusion: Reliance on total dietary iron intake and standard bioavailability assumptions substantially overestimates iron adequacy in this population. Improving iron status in adolescent girls requires a context-specific integrated approach that combines increasing iron intake, enhancing dietary iron bioavailability, and reducing menstrual iron losses. Such approaches may help tackle iron deficiency among adolescent girls in Malawi and similar settings.

ORAL Food sciences · BOKU University, Austria · ID 238

Synergistic effects of sorghum and pulse flours in yeast and sourdough bread

Jay Kumar Sirmoria, Rafaela Scheibelberger, Lucie Jurkaninová, Regine Schönlechner

The demand for sustainable and gluten-free bakery products has increased interest in alternative cereal–legume systems; however, sorghum, a climate-resilient cereal, remains limited in breadmaking due to its poor technological functionality. This study investigated the effects of partially substituting sorghum flour with pulse flours (soybean, fava bean, chickpea, and yellow pea) on bread quality, comparing sourdough and yeast fermentation systems. Composite recipes with 20% and 40% substitution were evaluated for baking loss, specific volume, volume yield, texture, and colour, alongside raw material composition. Results showed that flour type and substitution level significantly influenced bread quality ($p < 0.05$) with reference to 100% sorghum yeast fermented. 40% flour substituted by fava bean exhibited the most favourable performance, with the highest protein content in raw flour (~59.4%) and improved bread structure and elasticity (~50%), while yellow pea also demonstrated good functional balance in comparison to reference recipe. Soybean substitution, characterized by high fat content (~7.07%) in raw material, reduced baking loss (by ~4% compared to reference) but resulted in denser products with increased firmness (~40 & 80 N more for 20 & 40% substitutions) in comparison to reference. On the contrary, sorghum flour showed the highest starch content (~63.9%) and viscosity (~1700 cP), supporting structural formation. Sourdough fermentation generally increased firmness (by ~7 N) and enhanced crumb redness (by ~2.5 units) and yellowness (by ~6.5 units), with significant interaction effects between fermentation and recipe ($p < 0.05$). Nutritional estimation indicated that 40% fava bean recipe achieved protein levels up to ~35 g/100 g, while soybean-containing breads showed increased fat content (~5 g/100 g). Overall, sorghum–pulse combinations improved functional and nutritional properties compared to pure sorghum systems, with fava bean showing the most advantageous results, particularly under yeast fermentation. These findings demonstrate strong potential for developing sustainable and nutritionally improved gluten-free bread products.

ORAL Food sciences · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 203

Microbiological profiling and safety risks of grape pomace intended for food upcycling

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Grape pomace is an abundant wine industry by-product with significant potential for functional food development due to its high content of dietary fibre and phenolic compounds. Moreover, it exhibits potential prebiotic effects on the gut microbiota. Despite growing interest in its valorisation to functional foods and dietary supplements, specific legislative microbiological criteria for evaluating its safety remain undefined. The proliferation of autochthonous microbiota and potential pathogens during processing is a crucial factor limiting its industrial application.

The main aim of this study was to evaluate the microbiological quality of 20 grape pomace samples from diverse grapevine varieties grown in the Czech Republic, identify naturally occurring taxa, and assess the associated food safety risks.

Samples were analysed via cultivation using non-selective media, with quantitative microbial counts determination expressed in log CFU/g. Bacterial isolates displaying variability in cultivation characteristics were further analysed and identified using MALDI-TOF MS.

Results showed that while the substrate's low pH primarily supports specific autochthonous microbiota, potentially pathogenic microorganisms were present and persisted throughout processing. The observed high inter-sample variability underlines that low pH alone is insufficient to guarantee long-term microbiological stability. These findings highlight the critical need to establish standardized microbiological criteria to control microbial risks and ensure the safe integration of grape pomace into the food industry.

ORAL Food sciences · BOKU University, Austria · ID 230

Developing a rapid detection and quantification method for Cronobacter spp. in powered infant formula

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The bacterial genus *Cronobacter* comprises seven species (*C. sakazakii*, *C. malonaticus*, *C. turicensis*, *C. dublinensis*, *C. universalis*, *C. condimenti*, and *C. muytjensii*) that potentially pose a severe risk to neonatal health, with contaminated powdered infant formula (PIF) as the primary transmission vector. Current industry standards to detect the bacterial pathogens remain constrained by 4- to 7-day analytical timelines. To address this issue, the aim of this research was to develop a more rapid diagnostic pipeline. The study focused on optimizing a selective enrichment medium to eliminate the need for pre-enrichment and multi-step selective phases. By systematically evaluating various concentrations of sodium deoxycholate, NaCl, and sucrose, as well as different incubation temperatures as selective stress factors and using distinct *Cronobacter* and non-*Cronobacter* spp. strains to assess inclusivity and exclusivity, a definitive formulation was identified as follows: 0.15 mg/ml sodium deoxycholate, 2.0% NaCl, 15.0% sucrose, 41.5 °C. Using this specific formulation for enrichment provided the most robust suppression of competitive microbiota while enabling the reduction of the total diagnostic workflow to 24- to 48-hours. Furthermore, the integration of 16S rRNA-targeted nucleic acid lateral flow detection (RiboFlow®) provided a marker of metabolic viability that often causes false-positive results in DNA-based PCR protocols. Validation trials in commercial PIF demonstrated that this integrated approach could successfully detect all seven Cronobacter spp. in spiked infant formula samples. By replacing prolonged culture steps with kinetic-optimized growth and RNA-focused viability verification, the established pipeline offers a robust solution for enhancing safety protocols in infant formula production.

ORAL Food sciences · WUR - Wageningen University & Research, Nederlands · ID 247

The Best Intentions Spoil Too: Household Food Waste in Sub Saharan African

Kupa Namusomba

Wageningen University

Every year, more than one billion tonnes of food are wasted globally, while approximately 780 million people experience hunger. Food waste is not only a moral concern but also an environmental and economic challenge. Global food systems cannot be sustainable if nearly one-third of all food produced is lost or wasted.

Despite growing attention to food waste, most research has been conducted in Europe and North America. Much less is known about household food waste in Sub-Saharan Africa, where rapidly growing cities may face increasing waste levels as urbanisation and consumption patterns change. Understanding food waste behaviour before unsustainable habits become established presents an important opportunity for intervention.

This study explored household fruit and vegetable waste behaviour in Dar es Salaam, Tanzania, one of the fastest-growing cities in Sub-Saharan Africa. Using an exploratory qualitative approach, semi-structured interviews were conducted with adult household members from diverse socioeconomic backgrounds. Participants were also shown images of cosmetically imperfect fruits and vegetables to explore perceptions of freshness and food quality. The data were analysed using reflexive thematic analysis.

The findings suggest that fruit and vegetable waste is shaped by a combination of infrastructure constraints, practical food management skills, and cultural expectations surrounding freshness and hospitality. These factors influence how households purchase, store, use, and discard food in their daily lives.

This study provides important empirical evidence from an understudied context and contributes to a broader understanding of household food waste in the Global South. The findings offer insights for the development of locally relevant strategies to support more sustainable food consumption and reduce food waste. By identifying drivers of waste at an early stage of urbanisation, this research highlights opportunities to foster more sustainable food systems before unsustainable consumption patterns become entrenched hence strengthening the resilience of future food systems in rapidly urbanising regions.

ORAL Food sciences · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 21

Generational loss of traditional food knowledge and Its effects on food security among the Batwa people of Kisoro and Rubanda Districts, Uganda

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The Batwa, an Indigenous and marginalised minority community residing in Southwestern Uganda, were displaced following the implementation of the Ugandan government's 1990 biodiversity conservation policy. This displacement led to profound disruptions in their traditional food systems, livelihoods, and cultural continuity. Their removal without compensation or resettlement has resulted in persistent landlessness, livelihood precarity, and the erosion of traditional food systems. This study provides one of the first mixed-methods analyses linking the socio-economic conditions, food security status, and declining intergenerational transmission of traditional ecological knowledge among Batwa households in Kisoro and Rubanda Districts. Using a mixed-methods design, we conducted four key informant interviews (KIIs) and administered surveys to Batwa households (N = 67; 28 men and 39 women), employing the World Food Programme's Food Consumption Score (FCS). Results reveal that 75% of the Batwa households rely primarily on casual labour, while only 16% reported owning land. Food insecurity is severe: 59.7% fall within poor or borderline Food Consumption Score categories, reflecting low dietary diversity and dependence on purchased food or labour exchange.

Traditional knowledge loss is pronounced: 85% of individuals no longer consume forest foods, and 60% no longer pass this knowledge on to youth. These findings demonstrate that displacement, restricted forest access, and structural marginalisation have simultaneously undermined food security and cultural continuity. These patterns, observed among the Batwa, reflect broader challenges faced by Indigenous communities worldwide under exclusionary, conservation-driven displacement. Integrated, culturally grounded interventions, especially securing land access and revitalising Indigenous food knowledge, are essential for equitable development outcomes and long-term food system resilience for the Batwa.

ORAL Food sciences · WUR - Wageningen University & Research, Nederlands · ID 248

Exploring behavioural determinants of vegetable consumption and diet quality among urban households in Benin: a structural equation modelling study using the MOA framework

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Urban populations in sub-Saharan Africa are increasingly affected by the nutrition transition, characterized by shifts towards less healthy diets and rising NCD rates. Food safety, along with motivational, environmental, and ability-related factors, may influence vegetable consumption and diet quality, yet their roles remain underexplored. This study examined associations between drivers of vegetable consumption (Motivation, Opportunity, Ability) and diet quality among households in urban Benin.

We used secondary data from 927 adults (18-73 years) in Cotonou, Abomey-Calavi and Porto-Novo. MOA-related determinants were assessed via Likert-scale questionnaire statements, and diet quality via the Diet Quality Questionnaire. Structural equation modelling explored relationships between determinants and diet quality, focusing on dietary diversity (DDS), NCD-protective food group consumption (NCD-protect), and adherence to global dietary recommendations (GDR). Hygiene and organic food safety motives (FSMs), perceived availability, accessibility and affordability of vegetables in store, subjective knowledge about vegetable safety, and self-efficacy in consuming and preparing safe vegetables were assessed against these indicators, stratified by sex and neighborhood income.

Hygiene concerns were associated with lower dietary diversity, lower NCD-protective consumption, and poorer GDR adherence, while organic FSM was associated with better GDR adherence, particularly among men and in middle-income neighborhoods. Perceived availability was associated with higher dietary diversity, higher NCD-protective consumption, and better GDR adherence. Higher perceived vegetable affordability was linked to lower NCD-protective consumption and weaker GDR adherence in slums, but reversed in middle-income neighborhoods. Self-efficacy in consuming vegetables was associated with higher dietary diversity, while self-efficacy in preparing vegetables safely was associated with more monotonous diets, suggesting confidence alone may not improve diets amid structural constraints and limited knowledge.

These findings highlight the complex interplay of food safety perceptions, environmental constraints, and individual abilities in shaping dietary practices. Interventions should target context-specific barriers, enhance food safety knowledge, engage vendors, and promote access to diverse, nutrient-dense vegetables.

ORAL Food sciences · L'Institut Agro, France · ID 382

AI or experiments? Building trustworthy data for food packaging design

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Food packaging design is increasingly supported by predictive models, decision-support systems, and artificial-intelligence (AI) approaches. These tools can analyse large datasets to identify relationships between packaging properties, food matrices, storage conditions, and target shelf life. In particular, AI can accelerate the extraction, normalization, classification, and comparison of oxygen and water vapour barrier-property data reported across scientific literature. However, the reliability of AI-assisted outputs depends on the quality and completeness of the input data. Essential information, such as film thickness, temperature, relative humidity, partial pressure, is often missing or inconsistently reported. When this information is absent, AI can process available values at scale, but it cannot reconstruct the experimental context that was never recorded. This limits the reliability of material comparison, clustering, and future shelf-life prediction. The aim of this work was to develop a metadata-driven database framework to support AI-assisted and food-requirement-driven design of flexible biodegradable packaging materials. Mandatory metadata fields were defined to ensure that each oxygen or water vapour barrier-property value is linked to its material identity, formulation, structure, processing information, thickness, testing conditions, unit, source, and data-treatment level. The framework transforms isolated measurements into structured, traceable, and reusable data that can serve as reliable inputs for future computational tools. The database structure follows FAIR-oriented principles and is inspired by the TRANSMAT ontology. The database contains 52 materials, 547 replicate barrier-property measurements, and 20 ontology-inspired metadata and experimental descriptors. A search tool and a permeance map were developed to demonstrate the use of the database for material retrieval, traceability, and comparison of combined oxygen and water vapour barrier performance. This work shows that AI does not replace controlled experiments; rather, complete experimental metadata provide the trustworthy data foundation that enables AI-assisted analysis, shelf-life modelling, and packaging decision-support systems.

POSTER Food sciences · UNITUS - University of Tuscia, Italy · ID 183

From agri-food residues to bacterial cellulose: a sustainable fermentation approach

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Bacterial cellulose (BC) is a biodegradable biopolymer particularly promising due to its high purity compared to plant cellulose and its superior mechanical properties, making it suitable for a wide range of applications in biomedical, cosmetic and food packaging sectors. The present study focuses on the sustainable valorization of orange peel waste and green pea residues, promoting their use as alternative substrates for BC production by Komagataeibacter xylinus, with the aim of reducing waste generation and improving process sustainability within a circular economy framework. The selected matrices were subjected to combined physical, chemical and enzymatic treatments to obtain media enriched in fermentable sugars and nitrogen compounds, suitable for microbial growth and polymer production. Fermentation trials were carried out under both static and agitated conditions using waste-derived media and conventional Hestrin-Schramm (HS) medium as a control, to evaluate the influence of substrate composition and cultivation mode on BC production, morphology and productivity. The produced BC was then recovered and subjected to physicochemical characterization to assess the effect of different culture media on biopolymer properties, showing promising results in terms of BC quality and crystallinity. Overall, the results highlight the potential of agri-food residues as sustainable alternative substrates for BC production and provide a basis for future optimization and scale-up of the fermentation process.

POSTER Food sciences · University of Lleida, Spain · ID 254

Fate of T-2 and HT-2 Toxins During Oat Beverage Production

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Consumption of plant-based beverages, particularly oat-based drinks, has increased significantly in recent years due to their nutritional profile and growing consumer demand. However, oats are susceptible to contamination by toxigenic fungi capable of producing mycotoxins, secondary metabolites that may pose risks to food safety and public health. Understanding the fate of these contaminants during processing is essential for accurately assessing consumer exposure. In this context, this study evaluated the transfer of T-2 toxin (T-2) and HT-2 toxin (HT-2) from contaminated flour during oat beverage production. For this purpose, contaminated oat flour was used, and the experimental design included three initial flour concentrations (10, 15, and 20%), two enzyme contents, and five liquefaction times (15, 30, 45, 60, and 75 min) as process variables. Two process fractions were analysed: the beverage fraction and the solid fraction obtained after centrifugation (okara). Three replicates were performed for each condition. Toxins were extracted and purified using previously validated methods and quantified by HPLC-FLD. Mycotoxin partition between beverage and okara fractions was primarily driven by solids content and enzyme concentration. Lower solids content (10%) enhanced toxin transfer into the liquid phase, reaching 47.7–61.3% for T-2 and 27.5–37.3% for HT-2, whereas at 20% solids, these values decreased to 31.3–50.7% and 18.9–29.8%, respectively. Similarly, higher enzyme concentrations tended to increase transfer of both mycotoxins into the beverage fraction, with T-2 transfer increasing from 31.7–34.4% to 39.3–48.0% and HT-2 transfer from 18.9–20.9% to 23.4–26.7% at 20% solids. In contrast, no consistent effect of liquefaction time (15–75 min) on mycotoxin partitioning between fractions was observed. Under all evaluated conditions, T-2 exhibited higher transfer percentages than HT-2. These findings provide new insights into the fate of T-2 and HT-2 during oat beverage processing and could support future exposure assessments and establishment of regulatory limits within the European food safety framework.

POSTER Food sciences · SLU - Swedish University of Agricultural Sciences · ID 55

Understanding sustainable dietary behaviours in Sweden A cross-sectional quantitative study

Marianne-Sara Banda, Isabella Glinghammar

Sweden has for many years now emerged as one of the leaders in the work of sustainability because of its ambitious environmental goals and policies. However, the country's reliance on imported food and the agriculture sector's significant greenhouse gas emissions (GHGe) present challenges to its sustainability efforts. The food system comprises three interconnected parts: agriculture, the improved supply chain, and consumer dietary choices. Each of these components plays a crucial role in the sustainability of the food system. The topic of consumer behaviours is becoming increasingly prominent in discussions regarding sustainable food systems. This study therefore focuses on the sustainable eating habits of Swedish adults and investigates their understanding of sustainable dietary behaviours. This study is based on Kawasaki et al. (2024), who categorised sustainable dietary behaviours into five elements: food choice, storing and preservation, cooking, eating and disposal. A survey with randomised participants was conducted, resulting in 287 respondents, to examine Swedish adults' dietary choices and behaviours as well as their knowledge of sustainable behaviours. Respondents were also asked what influenced their choices and what barriers they identified in order to be more sustainable in their everyday lives. The results indicate that respondents associate sustainable dietary behaviours with eating in a way that helps mitigate climate change and does not harm the environment. The majority of respondents indicated that taste (57%), price (59%), and health (58%) were significant factors influencing their dietary choices. Additionally, many respondents cited high grocery prices and personal preferences as potential barriers to adopting more sustainable dietary habits. This study underscores the need for more research on sustainable dietary behaviours and clear guidelines for policymakers. Prioritising dimensions of sustainability and analysing flaws in the food system are crucial steps toward finding solutions.

POSTER Food sciences · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 89

In vitro screening of natural cannabinoid compounds with anticancer potential using 3D colorectal cancer spheroids

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Czechia

Colorectal cancer remains a leading cause of cancer-related mortality worldwide, and there is a continued need for novel therapeutic strategies with improved selectivity and reduced toxicity. Bioactive compounds from Cannabis sativa, including cannabinoids, terpenes, and flavonoids, have demonstrated anticancer effects in various experimental models. This study evaluated the growth-inhibitory activity of natural Cannabis sativa extracts using three-dimensional colorectal cancer spheroids, which more closely reproduce selected features of the tumour microenvironment than conventional two-dimensional cultures.

Seven ethanol extracts prepared from different parts of Cannabis sativa plants were applied to spheroids generated from the human colorectal adenocarcinoma cell line HT29. Spheroids were exposed to extract concentrations ranging from 2 to 64 µg/mL for ten days. Changes in spheroid growth, morphology, and structural integrity were monitored by confocal fluorescence microscopy, and spheroid volume was quantified using image-processing software and compared with control groups.

The tested extracts reduced spheroid growth in a time- and concentration-dependent manner. At concentrations above 16 µg/mL, the extracts disrupted spheroid compactness, leading to complete spheroid disintegration within six days. Potency varied across individual extracts, suggesting that extract-specific chemical composition and potential interactions between cannabinoid and non-cannabinoid constituents contribute to the observed activity. Importantly, the effects observed in the 3D spheroid model differed markedly from those in parallel 2D MTT assays, underscoring the relevance of advanced in vitro systems for preclinical screening.

These findings support the growth-inhibitory and spheroid-disrupting activity of Cannabis sativa extracts in a 3D in vitro model of colorectal cancer. Further studies should address chemical characterisation of the extracts, selectivity testing in non-malignant cells, and mechanistic analyses to clarify their potential relevance for colorectal cancer research.

POSTER Food sciences · BOKU University, Austria · ID 297

Implementing a trans-well co-culture system as a tool to unveil dynamic interactions in the cheese ripening microbiota

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Cheese is one of the best-known fermented products. Its quality depends on the activity and balance of its microbiota. However, contaminants originating from raw milk, such as Clostridium spp. or non-starter dairy propionibacteria, remain a major challenge for the dairy industry, sometimes leading to significant monetary losses for dairy farmers.

While these defects are well documented, the underlying dynamics of microbial interactions remain poorly understood. A combination of a traditional spot-on-lawn method with a trans-well co-culture system was used to investigate the interactions in the cheese ripening microbiota. The trans-well system enables the exchange of diffusible compounds through a semi-permeable membrane while maintaining physical separation between microorganisms, allowing the observation of interaction dynamics over time. Preliminary spot-on-lawn assays indicated the presence of inhibitory effects between selected strains while co-culture trials showed observable changes in growth across specific microbial pairings in vitro. This suggests the presence of metabolite-mediated interactions.

Beyond screening for interaction patterns, this work aimed to establish a reproducible experimental framework and contributes to the standardisation of trans-well co-culture in microbial ecology. Ultimately, this strategy may support improved understanding of contamination-driven defects in cheese production.

POSTER Food sciences · L'Institut Agro, France · ID 355

Development of a rapid method for detecting and quantifying Escherichia coli in tomato juice using near-infrared spectroscopy

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Food safety is increasingly threatened by microbiological contaminants that pose significant risks to public health, highlighting the need for rapid, reliable, and non-destructive detection and quantification methods. Conventional reference methods, such as colony-forming unit (CFU) counting, are reliable but can be time-consuming, labor-intensive, and costly, limiting their suitability for rapid routine monitoring. This study aimed to develop a near-infrared spectroscopy (NIRS)-based approach combined with chemometric modeling for the detection and quantification of bacterial cells in food samples. Different concentrations of *Escherichia coli* K12 Hfr were prepared in tomato juice as a representative liquid food matrix, and bacterial levels were quantified using the CFU method, expressed as $CFU.mL^{-1}$. Spectral data were collected using NIRS and then preprocessed to enhance signal quality, minimize noise, and reduce unwanted spectral variations. Swiss knife partial least squares (SKPLS) was subsequently applied in a multi-block arrangement to build predictive models capable of estimating bacterial contamination levels. The developed models showed high predictive performance, with a validation coefficient of determination (R^2) of 0.97 and a limit of quantification of about 5 $CFU.mL^{-1}$. These findings demonstrate that NIRS combined with chemometric analysis can provide a rapid, non-destructive, and efficient tool for detecting microbiological contaminants in liquid food matrices. Future perspectives should focus on increasing the dataset size, testing additional food matrices, and applying external validation approaches to confirm model robustness and improve practical applicability in routine food safety monitoring.

POSTER Food sciences · L'Institut Agro, France · ID 391

Standardising In vivo Dynamic Aroma Release Measurements Across Multitextured Food Matrices with Complex Aroma Compositions

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Aim: Understanding how complex food aromas are perceived across formats is essential for product development and quality consistency. However, differences in texture, composition, and consumption behaviour strongly influence aroma release, making comparisons across food matrices challenging. Moreover, many PTR-MS studies investigate single-parameter variations (e.g., consumer eating behaviour or product properties) and monitor only a limited number of aroma compounds, which restricts their relevance to complex food aromas. To address these limitations, this study integrates oral processing parameters into the design of a robust in vivo PTR-MS protocol, providing a reproducible and standardised approach to investigate aroma release across diverse food products, from liquid to solid matrices.

Methods: A series of preliminary experiments were conducted using PTR-MS to evaluate how methodological parameters influence aroma release measurements. These included instrument settings and the effects of exhalation, swallowing, and tongue movement on aroma intensity. To better reflect real consumption conditions, uninstructed oral processing behaviour was characterised in 10 participants. Parameters such as chewing duration and number of chews were used to design standardised consumption instructions. The resulting protocol controls inhalation, exhalation, product intake, chewing, and swallowing to decrease intra- and inter-individual variability.

The protocol was applied in an in vivo PTR-MS study with six semi-trained participants. Four product categories were investigated: a chocolate drink (reference), stuffed cookies, chocolate-coated wafers, and uncoated wafers, including multiple products per category.

Results & Conclusions: Preliminary observations indicate substantial inter- and intra-participant variability in aroma release profiles, highlighting the difficulty of direct in vivo comparisons. This emphasises the critical role of controlled consumption protocols in improving reproducibility when comparing complex food matrices rather than interindividual differences. The proposed approach shows potential to reduce variability linked to eating behaviour, enabling more reliable comparisons and contributing to robust methodologies for studying complex food aromas.

POSTER Food sciences · L'Institut Agro, France · ID 278

Exploring consumer acceptability towards traditional and innovative plant-based cheese combining implicit responses and explicit food preferences under blind and informed conditions

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The plant based cheese alternative (PBCA) market is expanding, yet these products continue to face sensory limitations. Most consumer studies rely on explicit self reports subject to cognitive and social desirability biases. To obtain a deeper and less biased understanding of consumer perception, this study combined explicit liking with an implicit marker of approach–avoidance motivation obtained through an EEG measure : Frontal Alpha Asymmetry (FAA),. The objective was to explore the relationship between implicit physiological responses and explicit preferences, and to determine how extrinsic information modulates these responses when comparing a traditional dairy cream cheese to two PBCAs.

Sixty non vegetarian Spanish consumers evaluated three products under blind and informed conditions while EEG activity was continuously recorded, one traditional cream cheese (Philadelphia), and two plant-based options (plant based Philadelphia, Violife). Participants completed psychometric scales assessing General Health Interest, Food Neophobia, Environmental concern and food choice motivations.

Explicit results showed that under blind conditions, the Traditional Philadelphia was significantly preferred over both PBCAs. After information disclosure, plant based Philadelphia was rated significantly higher than Violife, indicating a strong brand effect. In contrast, FAA values remained negative and showed no significant differences across products or conditions, revealing a general avoidance tendency rather than product specific affective responses. Using a neurosensory map integrating explicit and implicit responses, participants were segmented into four behavioural groups: Incongruent dislikers (G1), Congruent likers (G2), Congruent dislikers (G3), and Incongruent likers (G4). G4 was the most represented group across both Philadelphia products and conditions, suggesting explicit liking despite negative implicit reactions. Conversely, G3 remained the most populated group for Violife whether the condition, reflecting an explicit and implicit rejection alignment.

Overall, these findings reveal a clear dissociation between explicit and implicit measures and highlight the value of neurosensory segmentation for understanding hidden drivers of plant based product acceptance.

POSTER Food sciences · L'Institut Agro, France · ID 336

Neural correlates of flavor integration revealed by High-Density EEG using time-frequency analysis

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Flavor results from the integration of different sensory stimulations, including at least gustatory and retronasal olfactory signals combined as a multi-modal unified perception. An effect of this integration is the Odor-Induced Taste Enhancement (OITE), where congruent aromas enhance the perceived intensity of a taste. Although OITE has been observed at the perceptual level, the temporal neural mechanisms underlying taste-smell integration remain debatable and poorly understood. Identifying neural signatures associated with flavor integration may support the development of healthier and more sustainable food products by reducing the need for added sugar and salt while maintaining sensory acceptance. 47 adults (41 ± 12 years old, 27 women) participated in an EEG experiment using three conditions: aroma (banana), taste (sucrose), and flavor (aroma and sucrose). The delivery of the stimulus was synchronized with participants' respiratory cycle. Sweetness ratings were collected and neural responses were assessed using time-frequency analyses. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee CPP OUEST III#19.04.26 (ID RCB #2019-A00120-57). Sensory results showed a significant OITE effect, with the flavor condition rated significantly sweeter than the taste and aroma conditions. Time-frequency analysis revealed significant differences between flavor and the other conditions within the high-delta frequency band (3-4 Hz) at electrode Fpz. Specifically, the flavor condition exhibited reduced spectral power during two significant time windows (193-464 and 1116-1442 ms) compared to aroma and taste conditions. These findings contribute to the ongoing research for understanding the chronometry of flavor perception by revealing flavor-specific neural responses during both early (ERP P1-like) and late (ERP P3-like) processing stages. The early high-delta modulation suggests that taste-smell integration may occur at early stages of processing, potentially involving non-conscious mechanisms that support rapid food identification, a fact that was never observed in humans so far.

POSTER Food sciences · L'Institut Agro, France · ID 292

Using information about nutritional or environmental benefits to improve consumers' perception of hybrid dairy- and plant- based products. The mechanisms behind uneven results.

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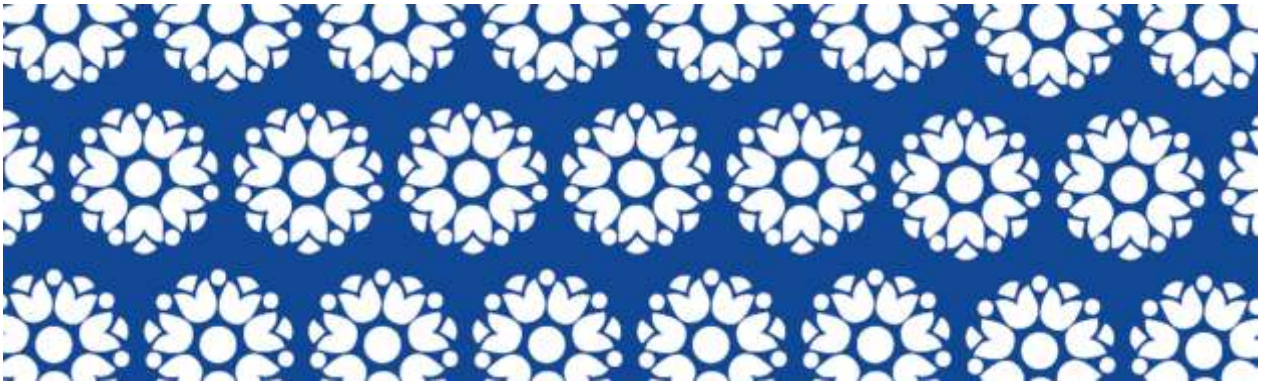
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Our study investigated whether information influences consumer appreciation of hybrid dairy products, and explored the mechanisms underlying any such changes. In these hybrid products, dairy ingredients are partially replaced by plant-based ingredients, to increase product sustainability, while mitigating the potential sensory drawbacks of plant-based ingredients.

89 participants were assigned to one of three groups, and performed sensory tests (hedonic and just-about-right) on the same four yogurt-like hybrid desserts, containing cow milk and lupin, in blind and informed conditions. In the informed conditions, each group received different information: composition alone, composition and nutritional benefits, or composition and environmental benefits. Participants also rated their expected liking, based on the same information but without tasting.

Providing nutritional or environmental information increased the hedonic scores of only one product, which was characterized by a moderate mismatch between expected and actual liking. By bringing liking scores closer to expectations, this effect of information supports the assimilation-contrast theory used as a theoretical framework. The deviation from ideal intensity for the five studied attributes did not depend directly on the information provided for these hybrid dairy products. Nutritional and environmental information increased participant tolerance of sub-optimal sweetness and green notes or excessive astringency. The acceptance of sub-optimal freshness and fruitiness depended on the type of information provided, which may result from a halo effect.

This study offers guidance on how to use information effectively to help consumers better accept reduced sensory quality in sustainably designed products.



TRACK

Forestry

Wood ELLS is there? - From Seed to Canopy

19 abstracts · 9 oral presentations · 10 posters

ORAL Forestry · UNITUS - University of Tuscia, Italy · ID 311

Assessment of Forest Ecosystem Services and Landscape-Scale Decision Support: Evidence from a Regional Assessment of Lazio's Forest Heritage for Policy Development.

Francesco Carbone, Joelle Jabre
PhD Student

Forests are ecological systems which deliver important socio-economic benefits to our societies through provision of forest products and other forest ecosystem services. However, decisions about forests tend to remain strongly focused towards marketable goods and cultural services of forests are less visible in planning and policy processes. This doctoral thesis aims at developing a conceptual framework for valuing forest ecosystem services of selected forest areas of the Lazio region in Italy, with the objective of supporting sustainable forest management, regional bio economy development and evidence-based policy. Five forest functions will be assessed in this study: wood production, biodiversity conservation, direct protection, tourism and recreation, and aesthetic-landscapes. The research will be conducted in selected territories of the Lazio Region, including Colli Albani, the municipalities of Lazio region within the protected area of the Abruzzo, Lazio and Molise National Park, Monti Simbruini, and Monti Aurunci. Literature review, documents about forests of the region and its protected areas, databases on environment, and stakeholder survey and interview will be the data sources. Stakeholders' preferences will be collected by using an adapted SMART/SWING weighting approach and integrated into a multi-criteria decision analysis framework. Also, economic valuation techniques will be used to analyze selected ecosystem services to make the economic values of forests more transparent. The expected outcome is a decision-support framework that will help identify priorities, and trade-offs between forest functions. Linking ecosystem-service assessment, stakeholder preferences, economic values, and policy recommendations, will help to move from timber-centered forest management toward multifunctional and sustainable forest planning in Lazio.

ORAL Forestry · University of Lleida, Spain · ID 281

Dendrochronological analysis of forest decline and mortality associated with Armillaria in Pinus uncinata forests in the Pyrenees

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Subalpine forests in the Pyrenees are increasingly threatened by the interaction of climate change and biotic stressors. This study investigates the role of the root rot fungus Armillaria in the mortality of mountain pine (Pinus uncinata). By examining 130 trees across a health gradient (ranging from healthy controls to trees dead for decades) we aimed to determine if tree mortality is accelerating and how infection status alters forest resilience to extreme climate events.

Using dendrochronological methods, we measured annual growth rings to calculate Basal Area Increment (BAI) and used resilience indices to evaluate tree responses to "hotter droughts." We also implemented growth-averaging techniques to detect sudden growth increases ("releases") that occur when neighboring trees die, freeing up resources like light and water.

Initial findings indicate a significant 'signal inversion' in how infected trees respond to climate. While healthy trees follow classic patterns where high late-summer temperatures limit the following year's growth, infected trees show a decoupled response. Our data suggests that because their root systems are compromised, they become more dependent on internal energy reserves, making them significantly less resistant during acute drought years. Furthermore, preliminary spatial analysis of 'releases' points to a dynamic where trees closer to the mortality front show higher growth increases as neighboring trees die, supporting a fungus-driven gap-dynamics hypothesis.

These results indicate that Armillaria infection erodes the physiological resilience of mountain pines, making them acutely vulnerable to the increasing aridification of the Pyrenees. Understanding these interactions is essential for developing sustainable forest management strategies and identifying early-warning signals of forest collapse in mountain ecosystems.

ORAL Forestry · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 137

Conserving the Silver fir (Abies alba) gene pool in the Krkonoše Mountains: Population genetic analysis for seed orchard establishment

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Silver fir (Abies alba Mill.) is a crucial stabilizing species in Central European forests, but its local populations have suffered severe historical declines due to inappropriate forest management and heavy air pollution. Effective conservation of its gene pool requires a detailed understanding of the genetic structure of reproductive material. This study evaluates the genetic diversity and population structure of 49 elite individuals originating from a putatively autochthonous population in the Krkonoše National Park (Czech Republic), selected as a source of scions for a new seed orchard. Using a panel of 23 nuclear microsatellite markers (nSSRs), key population-genetic parameters, spatial genetic structure, and mutual relatedness were assessed. Additionally, an optimization algorithm was applied to simulate the reduction of the clone collection to 30 individuals to minimize mutual relatedness. The analysis revealed a moderate level of genetic diversity with a notable deficit of heterozygotes; observed heterozygosity (Ho = 0.307) was lower than expected heterozygosity (He = 0.442), resulting in a positive inbreeding coefficient (F = 0.254). These findings suggest a probable impact of historical population fragmentation and past forest management practices. Spatial analyses confirmed an absence of spatial genetic structure, indicating an efficient gene flow. The effective population size was estimated at Ne ≈ 21. Simulation models demonstrated that while systematically narrowing the selection to 30 individuals would decrease mutual relatedness, it would also lead to an irreversible loss of 6.4 % of the detected alleles, including rare variants vital for future resilience. From the perspective of gene pool conservation, the main recommendation of this study is to refrain from any further selection among these elite trees and to utilize the entire set of all 49 evaluated individuals for the establishment of the seed orchard.

ORAL Forestry · NMBU - Norwegian University of Life Sciences · ID 335

Does Local Forest Reliance Promote Forest Conservation in the Tropics?

Arild Angelsen, Daniel Grandisky Lerner
NMBU

Forest cover in developing countries is increasingly threatened by rising accessibility and the expansion of activities with higher economic returns than standing forests. At the same time, populations living in forest regions often face isolation and economic exclusion, making forest land and products an important source of income for rural livelihoods. This spatial overlap between forests and poverty imposes a central challenge for sustainable development: how to improve livelihoods while preserving natural ecosystems. In this paper, we combine household and village level data from the large Poverty and Environment Network (PEN) survey on income sources and institutions with satellite data on forest cover to estimate the link between forest reliance and deforestation over a fifteen-year period, from 2010 to 2024. The PEN dataset applied in this study covers 7,543 households in 315 villages across 23 developing countries, allowing us to draw conclusions from a highly heterogeneous sample and with global applicability. The paper contributes to this debate by showing that communities more reliant on forest income experience lower subsequent deforestation. We further hypothesize and find empirical support indicating that stronger local governance and institutional quality reduce both internal and external pressures on forest cover.

ORAL Forestry · University of Lleida, Spain · ID 300

Analysis of seasonal sporulation patterns of the forest pathogens Heterobasidion annosum and Heterobasidion abietinum in conifer forests of catalonia

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This study analyzes the seasonal sporulations patterns of the forest pathogens Heterobasidion annosum and Heterobasidion abietinum in conifer forests in Catalonia. Sampling was conducted between May 2024 and April 2025, and spores were collected from different forest tree species, including Abies alba, Pinus sylvestris, Pinus nigra, Pinus halepensis, and Pinus uncinata, across a range of altitudes. DNA extraction techniques and qPCR analyses were used to identify and quantify the two pathogens.

The results show that both pathogens can coexist within the same habitats. Significant differences were observed in spore abundance depending on the host tree species, the sampling month, and the interaction between these factors. Heterobasidion annosum was found to affect primarily Abies alba, Pinus nigra, Pinus sylvestris and Pinus uncinata, indicating a broader host range and a high potential risk for forest stands. In contrast, Heterobasidion abietinum was detected mainly in Abies alba, suggesting a more restricted distribution.

Both pathogens exhibited similar seasonal patterns. Their dispersal was favored during the warmer months, whereas their activity was greatly reduced or even absent during the colder months.

The factors most likely influencing their dispersal include summer drought conditions and proximity to infection sources. Identifying sporulation periods provides valuable information for the forest management of each pathogen and its associated host tree species.

ORAL Forestry · BOKU University, Austria · ID 222

Pedunculate oak regeneration in edge habitats in the nature reserve Untere Marchauen

Lea Miskulnig

Pedunculate oak (Quercus robur) is of major importance for Central European floodplain forests due to its high ecological value, structural importance and adaptability to environmental stressors. However, oak saplings frequently fail to reach higher growth stages, leaving regeneration in a critical state. Extreme weather events such as floods, combined with reduced browsing pressure, may promote oak regeneration. Such an event occurred in the study area in the autumn of 2024. This study examines the development of pedunculate oak regeneration in a grazed area of the Nature Reserve Untere Marchauen which is situated in the east of Austria. As forest edge structures can provide favourable establishment conditions, oak saplings were surveyed in three edge zones during a repeated inventory in the autumn of 2025, based on a survey from 2022. Changes in seedling abundance, regeneration density, mean height and height-class distribution were assessed. The results show an increased number of individuals (+134%) and sapling density, alongside a decrease in mean height (-4,2 cm) and shift towards lower height classes. These patterns indicate an enhanced recent recruitment of new seedlings, while height growth remains limited. This may be associated with favourable recruitment conditions like mast seeding events and reduced browsing pressure following a declined wild boar population after the 2024 flood event.

ORAL Forestry · L'Institut Agro, France · ID 160

Automatic extraction of agronomic indicators from time series collected through plant-based sensor monitoring : the case of sap flow data

Tanguy Fournel

Institut Agro Montpellier

The accuracy, reliability, and accessibility of agronomic indicators are key factors influencing the quality and relevance of recommendations provided by agricultural advisors. In this context, sap flow sensors installed directly on grapevines provide continuous and detailed measurements of plant physiological water use, enabling the derivation of these critical agronomic indicators.

This work aims to develop a general framework detecting agronomic indicators currently identified by experts, despite the challenges of exploiting in-situ sensor time series.

This work is distinguished by (i) using experts' interpretation to build the validation dataset and the algorithm mechanism, (ii) handling data imperfections such as noise, missing values, outliers, and uncertainty and (iii) developing a real-time approach for time series data that are still being collected.

The methodology was designed and tested on 100 sap flow time series to detect the maximum basal crop coefficient (Kcbmax), corresponding to peak vine transpiration relative to atmospheric demand. To account for the noise in the data, three smoothing methods were tested: Savitzky–Golay Filter, Weighted Moving Average smoothing and Gaussian Filter. Then, simple decision rules inspired by agronomic expertise were applied to detect Kcbmax on the smoothed curve. The approach was validated using an independent time series dataset annotated by experts.

Results identified the optimal parameters for each smoothing method through minimization of residual autocorrelation. Because of similar mathematical foundations, the smoothing methods exhibited comparable performances after optimization. The three methods were evaluated by comparing the predicted Kcbmax values and occurrence dates against expert annotations using MAE, RMSE, and bias. Kcbmax values were predicted more accurately than occurrence dates.

Overall, the results demonstrate that it is feasible to develop a robust algorithm for detecting agronomic indicators, even when dealing with imperfect data, variable expert annotations, and the limited datasets typical of in situ sensor collections.

ORAL Forestry · Lincoln University, New Zealand · ID 104

Identification of fungal pathogens associated with cankers in sweet cherries in Central Otago, New Zealand

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Cherry trunk canker is an emerging concern in New Zealand cherry orchards. While the disease has traditionally been attributed to *Pseudomonas syringae*, recent studies have identified the fungal pathogens *Cytospora* spp. and *Calosphaeria pulchella* in association with trunk canker symptoms. These pathogens are widely distributed and have caused significant economic losses in cherry-growing regions worldwide. This study investigated the incidence of these fungal pathogens associated with trunk canker symptoms in commercial cherry orchards across Central Otago, New Zealand.

Field surveys were conducted across multiple cultivars, orchard systems, and tree ages during pre- and post-harvest periods. Surface-sterilised symptomatic wood samples were used for fungal isolations, and resulting fungal colonies identified by multilocus sequence analysis incorporating ITS, TEF1-α, ACT, and TUB2 loci. Of the 320 samples analysed, both fungal pathogens were recovered from all surveyed orchards. *Cytospora* spp. was recovered in 40% of samples, while *Cal. pulchella* was recovered in 18%. Co-detection of both fungal pathogens occurred in 8% of samples. In addition, *Pseudomonas syringae*, *Alternaria* spp., *Epicoccum* spp., *Boeremia* spp., and *Sclerotinia* spp. were also recovered from symptomatic tissues. The frequent detection of multiple pathogens within the same symptomatic tissues suggests that canker symptoms may involve a more complex disease syndrome than previously recognised.

A second component of the project evaluates the efficacy of several treatments in protecting pruning wounds, which are recognised as main infection sites, against infection by *Cytospora* spp. and *Cal. pulchella*. Survey observations showed that fungal pathogens could still be recovered from wounds treated with commercially available sealants, suggesting potential limitations in current wound protection practices. The project provides evidence-based recommendations for growers regarding the prevention and management of infections caused by these pathogens in cherry trees.

ORAL Forestry · SGGW - Warsaw University of Life Sciences, Poland · ID 197

Nature-driven protection of beech wood: linseed with pine oil addition against water and fungal attack

Grzegorz Mosiej

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Wood is susceptible to biodegradation, with water and fungi as main factors limiting its durability. Due to the growing interest in environmentally friendly wood preservation methods, products based on natural and renewable materials are increasingly being investigated. Particular attention has been given to linseed oil, which exhibits hydrophobic properties and may reduce microbial growth, as well as to essential oils with potential biocidal activity. This research supports the development of more sustainable and innovative approaches to wood protection by exploring natural, renewable compounds as potential alternatives to conventional preservatives.

The aim of this study was to evaluate the effect of adding pine essential oil to linseed oil on the water absorption and resistance of beech wood (*Fagus* L.) to colonization by selected fungal species.

A total of 150 beech wood samples were prepared. The samples were impregnated using a vacuum method with linseed oil or linseed oil enriched with pine essential oil at concentrations of 2%, 6%, and 12%. Water absorption was measured after 1 min, 30 min, 1 h, 24 h, 72 h, 12 days, 45 days, and 105 days of immersion in water. Resistance to fungal growth was evaluated using the following species: *Alternaria alternata, Aspergillus niger, Trichoderma viride*, and *Chaetomium globosum*. The degree of surface colonization was determined by image analysis using ImageJ software.

The results showed that impregnation with linseed oil reduced the water absorption of beech wood and limited the growth of the tested fungal species. However, the addition of pine essential oil to linseed oil did not significantly changed the hydrophobic properties of the wood. Its effect on resistance to fungal growth depended on the fungal species and did not show a clear relationship between pine essential oil concentration and the effectiveness of protection against fungal colonization.

POSTER Forestry · UNITUS - University of Tuscia, Italy · ID 316

Soil organic matter dynamics and carbon stabilization in chestnut forest soils of central Italy: an integrated molecular assessment

Federico Stotani, Rosita Marabottini, Sara Marinari

Università degli Studi della Tuscia

Soil organic matter (SOM) plays a key role in maintaining soil fertility, regulating nutrient availability, supporting plant growth and contributing to carbon storage. Therefore, understanding how SOM forms and remains stable in soils is essential for improving the sustainable management of forest ecosystems and supporting climate change mitigation strategies. In this context chestnut forests are of particular interest because of their wide distribution and high soil carbon sequestration potential.

In this study, combined tools were employed to analyse the composition, stability and dynamics of SOM in chestnut forests located in four areas of central Italy. An advanced analytical technique, pyrolysis coupled with gas chromatography and mass spectrometry (Py-GC/MS), was used to identify the main molecular components contributing to organic carbon stabilization and dynamics. The molecular results were interpreted in relation to enzymatic activities, soil physicochemical and biochemical parameters analysed from samples collected at two depths (0–30 cm and 30+ cm).

This integrated approach highlighted differences in carbon transformation and stabilization, as well as in the quantity and quality of SOM among the study areas, reflecting the influence of local pedo-environmental conditions on soil development and carbon dynamics.

The findings contribute to the identification of molecular indicators that can be used to assess soil carbon dynamics and ecosystem resilience. These indicators may provide valuable support for management strategies and policies aimed at enhancing carbon sequestration, conserving soil resources and strengthening the capacity of forest ecosystems to cope with environmental change.

POSTER Forestry · UHOH - University of Hohenheim, Deutschland · ID 267

Seasonal root dynamics and satellite-derived canopy responses in full-sun and agroforestry coffee systems in Costa Rica

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Climate variability increasingly challenges coffee production, creating a need for more resilient management systems. Agroforestry systems are often promoted as a climate-resilient alternative to full-sun coffee cultivation, yet knowledge of seasonal root dynamics and their relationship with aboveground canopy responses remains limited.

This study investigated the spatial and seasonal dynamics of coffee root length density (RLD) in full-sun and agroforestry systems in the Western Central Valley of Costa Rica and examined their relationship with canopy responses derived from Sentinel-2 vegetation indices. Root measurements were conducted across seasons and soil depths, and distances from the coffee stem, while satellite imagery was used to monitor canopy condition and stress responses.

Both production systems exhibited pronounced seasonal RLD changes, with a marked decline during the transition from the dry to the rainy season followed by recovery during the rainy season. However, recovery patterns differed between systems. In the full-sun system, canopy greenness recovered rapidly after the onset of rainfall, whereas root recovery occurred more gradually. In contrast, the agroforestry system showed a rapid recovery of RLD shortly after the beginning of the rainy season, while canopy recovery was slower. Spatial differences were also observed: coffee plants in the agroforestry system exhibited significantly higher RLD in the upper soil layers (0–30 cm) than those in the full-sun system, indicating contrasting belowground resource acquisition patterns.

These findings demonstrate that aboveground and belowground responses to seasonal climatic variability may occur asynchronously and that their temporal relationships differ between coffee production systems. Integrating field-based root observations with satellite-derived vegetation indices provided insights into whole-plant responses that would not have been apparent from belowground measurements alone. Such knowledge can support the development of more climate-resilient coffee production strategies and improve resource-use efficiency through better alignment of fertiliser timing and placement with temporal and spatial root dynamics.

POSTER Forestry · UHOH - University of Hohenheim, Deutschland · ID 386

Root distribution in temperate agroforestry systems: Implications for soil carbon sequestration

Jakob Wieland

Temperate agroforestry is regarded as an essential system for diversifying agricultural landscapes, enhancing ecosystem services, and contributing to climate change mitigation and adaptation. This study examines root distribution and soil organic carbon (SOC) dynamics in a mature silvoarable wild cherry (*Prunus avium L.*)-winter wheat (*Triticum aestivum*) system in southern Germany.

Root length density (RLD) and SOC were assessed in May and August 2025 across six distances from the cherry tree row and six depth intervals down to 95 cm. Roots were sampled by augering, separated by species, and scanned on a flatbed scanner; scans (n = 331) were analyzed using WinRhizo; SOC was determined by loss-on-ignition at 550°C with gas analysis.

Cherry RLD was highest at the tree row and declined sharply with distance, with more than 90% of root length confined to the first 5 m. Root plasticity shifted cherry growth from the topsoil in May into mid-soil layers (45–60 cm) later in the season. Winter wheat RLD was highest at 13 m from the tree and remained concentrated in the upper 30 cm throughout the season.

SOC declined with both distance and depth. Using a space-for-time substitution approach, SOC stocks near the tree declined from 136.11 to 112.85 t ha^{-1} (−17.1%) between sampling dates, while distant zones remained largely stable. Sequestration rates were highest in mid-soil layers, and including the tree row raised estimated sequestration potential to 0.54–0.77 t ha^{-1} yr^{-1}, underlining the disproportionate contribution of the tree row to system-level carbon storage.

Temperate agroforestry represents a viable option for agricultural carbon sequestration, though yield losses of up to 25% near the tree row remain a critical barrier to farmer adoption, necessitating optimized system design to reconcile productive and climate goals.

POSTER Forestry · EMU - Estonian University of Life Sciences · ID 184

Condition of mixed stands managed with alternatives to clear-cutting in Estonia

Indrek Kuld
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In the Nordic countries, including Estonia, forestry is of great economic and social importance. Forest management in the Nordic region has mainly been based on clear-cutting; alternative harvesting methods have been used to a limited extent in mature forests. In recent years, however, the public has increasingly demanded that clear-cutting be replaced with less intensive management practices.

From the perspective of sustainable forest management, key indicators include stand health and regeneration capacity. Estonia's native tree species are generally light-demanding, which presents a challenge for the natural regeneration of stands. Norway spruce (Picea abies) is the only economically important shade-tolerant tree species, but spruce is generally known to be associated with problems such as root rot, bark beetle, and wind damage.

This study examined the stand volume and composition, natural regeneration, tree health, and the volume and occurrence of deadwood of 70–132-year-old stands managed with shelterwood and selection cutting 10–27 years earlier.

During the time since harvesting, the basal area of the studied stands had mostly recovered to a level that, considering legal restrictions, would allow a new cutting operation. However, the potential harvestable timber volumes would generally remain modest.

The long-term development of the stands is directed towards the formation of pure spruce stands, as both the lower tree layers and natural regeneration consist mainly of spruce. The proportion of other tree species in the regeneration layer was rather random. The annual height increments of spruce regeneration varied considerably, remaining mostly below an average of 10 centimeters.

Tree health was assessed on a scale from 0 to 3 (0 - healthy tree; 3 - dying). Across the studied stands, the mean health score of first-layer trees was 0.81 (range 0.1 to 1.5); for spruce natural regeneration, the corresponding value was 1.45 (0.6 to 1.9).

POSTER Forestry · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 169

Contrasting vegetation development trajectories on reclaimed and successional spoil heaps revealed by multi-Temporal lidar: Implications for restoration management

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Surface coal mining and subsequent restoration strongly affect landscape structure and ecosystem development. Yet quantitative assessments of vegetation development under different restoration approaches remain limited. Using multitemporal lidar data acquired in 2011, 2017, and 2024, we quantified changes in vegetation structure in particular vegetation height, cover and density across vertical vegetation layers. Vegetation development was compared among successional and forest-reclaimed sites of different ages across four spoil heaps in the North Bohemian Brown Coal Basin. We also linked vegetation structure to bird diversity to model biodiversity changes over time.

Pronounced changes in vegetation structure were observed between 2011 and 2024, with differences among reclamation categories. Canopy height increased markedly across most of the study area (on average by 5.6 m), while younger reclaimed sites exhibited faster vegetation growth (6.9m) compared to older ones (5.2m). Canopy cover increased substantially (from 54% to 81%), with the largest gains in younger reclaimed sites, while successional areas also increased (34%) but maintained the lowest overall canopy cover across all periods. Changes in vegetation density across vertical layers indicated a shift towards higher vegetation layers over time. Among the vegetation metrics, canopy height variability showed the highest explanatory power for bird diversity, explaining 65% of its variation. Increasing canopy height variability over the study period was associated with a rise in predicted species richness. Multitemporal lidar thus provides a powerful tool for assessing long-term vegetation development and supporting restoration management.

POSTER Forestry · L'Institut Agro, France · ID 343

Life History traits and interspecific interactions between the Pinewood nematode, its close related-species and a pathogenous fungi

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Invasive alien species are known to contribute to the extinction of native species through various mechanisms, such as competition, disease transmission or predation. This study aims to better understand the biotic and abiotic factors likely to influence the population dynamics of an invasive species: the pinewood nematode (PWN), *Bursaphelenchus xylophilus*. This nematode is the causative agent of Pine Wilt Disease. It has been recognised as a major threat to forest ecosystems, leading to extensive tree mortality, loss of biodiversity and considerable economic losses. In this study, we focus on the interactions between the pine wood nematode, which is an invasive species native to North America, its sister species *Bursaphelenchus mucronatus* that is native to Eurasia, and the pine pathogenic fungus *Diplodia sapinea*, also native to Eurasia. We therefore conducted a five-week in vitro experiment to study the nature of these interactions at different temperatures. Firstly, an effect of temperature on nematode population dynamics was observed, with the overall abundance being higher at 30 °C than at 22 °C. Marked differences were also identified between the pinewood nematode and its sister species, particularly in a context of competition on the fungus *D. sapinea,* where, after a certain time, *B. mucronatus* appears to gain the upper hand over *B. xylophilus.* Although this knowledge is essential for understanding the invasive dynamics of the PWN in Europe, little information is currently available on the effect of temperature or fungal communities on the interactions between *B. xylophilus* and *B. mucronatus.* This study, however, marks the start of further research into this topic.

POSTER Forestry · WUR - Wageningen University & Research, Nederlands · ID 349

Dynamics in pioneer dune systems: Unraveling physiotopes to understand embryonic dune diversity under coastal management

Anna Enter

Background Coastal dune systems provide critical ecological functions and coastal protection, with embryonic dunes representing the most dynamic pioneer stages. While vegetation responses are frequently studied, the concurrent impact of management paradigms and beach nourishment on the landscape-level diversity of these embryonic habitats, characterized as distinct physiotopes, remains poorly understood. *Aim* This study assessed how sand nourishments indirectly shape embryonic dune ecosystems, by evaluating the direct influence of physical parameters (grain size, beach width, and slope) and management types on both physiotope diversity and vegetation community composition along the Dutch coast. *Methods* Using a comparative research design, empirical data were collected across five distinct coastal locations in The Netherlands: Terschelling, Hondsbossche Duinen, IJmuiden, Kwadehoek, and Schouwen-Duiveland. Physiotopes were delineated in GIS and ground-truthed in the field to establish reference and active embryonic dune sites. Vegetation cover and species abundance were sampled within plots across each physiotope, paired with soil cores for analysing grain size, moisture content, and organic matter. These primary data were integrated with national datasets on management type, beach width and slope. Multivariate and univariate analyses were conducted to isolate the independent and interactive effects of management type, grain size, beach morphology, and abiotic factors. *Results* Preliminary findings indicate that dynamically managed locations characterized by expansive beach widths exhibit greater embryonic physiotope heterogeneity, which directly correlates with higher plant species diversity. *Conclusion* These results demonstrate that the localized physical geography, developed under the influence of sand nourishment schemes, dictates the ecological structure of embryonic dunes. To foster long-term coastal resilience, future protection and nourishment schemes should accommodate dynamic management strategies that facilitate the natural development of diverse dune habitats.

POSTER Forestry · BOKU University, Austria · ID 251

Seasonal versus drought-induced osmotic adjustment in Vitis vinifera cvs. Riesling and Blaufränkisch: Cultivar differences and carbohydrate dynamics

Martina Wilfinger

Under climate change, drought is an increasing challenge for viticulture. Osmotic adjustment (OA), the accumulation of solutes to maintain cell turgor under low water potential, is considered a drought-tolerance mechanism in grapevine, potentially differentiating drought-tolerant from drought-susceptible cultivars. However, osmotic potential (OP) decreases not only during drought but also throughout the growing season, independently of water status and cultivar. Non-structural carbohydrates (NSC) are major contributors to OP, yet their role under drought remains unclear. The combination of these aspects is rarely studied together.

This thesis compares drought-induced and seasonal OA in *Vitis vinifera* cvs. Riesling and Blaufränkisch and examines the role of NSC under water deficit. A controlled field experiment with potted vines was conducted during the 2025 growing season. Half of the vines were subjected to a 10-day drought treatment in July through progressive irrigation reduction, followed by rewatering and seasonal monitoring until the end of September. Throughout the experiment, osmotic potential at full turgor (π_{100}), gas exchange, stem water potential (Ψstem), leaf and petiole NSC concentrations were measured. In September, yield parameters were documented.

Despite severe water deficit (Ψstem ≈ −2.0 MPa), neither cultivar exhibited drought-induced OA. Rapid stress onset combined with high temperatures, likely limited plant carbon availability. Drought appeared to have a minor effect on leaf NSC content, possibly caused by export reduction to other plant organs. The pronounced seasonal decline in π100 (−0.69 MPa) across all vines closely tracked the accumulation of leaf soluble sugars. Cultivar differences emerged during berry maturation, with Riesling reaching lower π100 values than Blaufränkisch, before converging after harvest. These results indicate that seasonal OA exceeds drought-induced OA and that OA under drought is not guaranteed under all conditions. Changes in OP are driven by cultivar-specific carbon dynamics and source–sink relationships, suggesting OA is not a suitable standalone drought tolerance indicator.

POSTER Forestry · UHOH - University of Hohenheim, Deutschland · ID 51

Between Water Sharing and Competition: QTL Mapping of Drought Tolerance in Soybean (Glycine max)

Nikola Jocic

University of Hohenheim

In agriculture, plants do not grow in isolation, but in dense populations. Such high-density environment inevitably lead to high competition for local resources like light, water or nutrients. However, when plants invest into competition structures, such as plant height, less resources remain for yield components. Thus, genotypes which restrain this competitive investment are more desirable. When these "cooperative" genotypes are grown together, they collectively produce higher yields.

Recent studies have shown that cooperative soybean (*Glycine max* (L.) Merr.) genotypes tend to use less water under drought conditions, leading to less drought symptoms in themselves but also in their neighbors. In contrast, competitive genotypes consume more water, depleting shared water faster and rendering them more drought susceptible. Thus, drought tolerance can be used as a good indicator for cooperative or competitive behavior.

In my master thesis, I try to identify genomic regions linked to drought tolerance in soybean through QTL mapping. This process involves combining genotypic data with phenotypic data. Phenotypic data will be collected in a greenhouse experiment where two recombinant inbreed soybean lines, derived from crosses between cooperative and competitive genotypes, will be exposed to drought stress. Several drought related traits will be recorded by visual scoring and NIRS.

Ultimately, this study tries to identify genomic regions to assist breeding of new soybean varieties that are more drought resistant and cooperative.

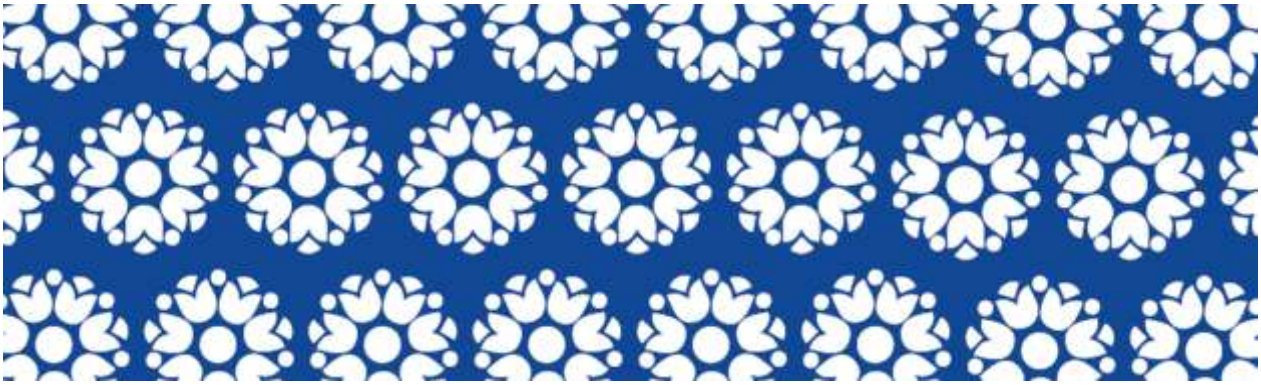
POSTER Forestry · L'Institut Agro, France · ID 393

Sodium alginate coating and Trichoderma biopriming as low-input strategies to improve cowpea seed germination under salt stress

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Salinity is one of the main abiotic stresses limiting crop germination and establishment worldwide. Cowpea (*Vigna unguiculata*) is a legume valued for its nutritional quality and resilience, yet its response to salt stress during germination remains critical to explore. This work evaluated two low-input biotechnological strategies — seed coating with sodium alginate (2%) and biopriming with native *Trichoderma* strains — to enhance cowpea germination under saline conditions. Two trials were conducted. First, a dose-response assay determined the inhibitory concentration 50 (IC50), exposing seeds to seven NaCl concentrations (0 to 220 mM) following ISTA protocols. Second, coating and biopriming treatments (strains T1 and T2, with or without sodium alginate) were applied at the IC50 level and compared against an untreated control. Statistical analysis was performed using R (4.5.2), and imbibed seed surfaces were analyzed by SEM (ZEISS EVO15). The IC50 was established at 177 mM NaCl, confirming moderate salinity sensitivity during germination. Crucially, SEM images revealed that *Trichoderma* spores remained trapped within the polymer matrix. While no significant difference in salt tolerance was found relative to the control, these findings provide pivotal insights: they demonstrate that sodium alginate at 2% concentration may limit the bioavailability of the biostimulant agent through its structural properties, and highlight the necessity of isolating halotolerant *Trichoderma* strains from naturally saline soils to ensure effective biostimulation. This study establishes a foundational baseline for optimizing next-generation bio-polymeric seed coatings under abiotic stress. Different concentrations of other biopolymers, such as guar or arabic gum, will continue to be tested to enhance or synergize the effect of *Trichoderma* strains.



TRACK

Landscape architecture

Green mod'ELLS - re-designing landscapes for future generations

16 abstracts · 6 oral presentations · 10 posters

ORAL Landscape architecture · SLU - Swedish University of Agricultural Sciences · ID 52

Green infrastructure in arid enviroments: lessons from Mendoza, Argentina

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This study examines how green infrastructure can function as a multifunctional strategy for climate regulation in cities with hot and arid climates. Using Mendoza, Argentina, often described as an "oasis city", as a case study, the research analyses how the city's street tree structure and historic irrigation system (acequias) interact to create thermal comfort, spatial qualities, and cultural identity in the urban streetscape. The aim is to identify transferable lessons for the design of future climate-adapted and sustainable cities.

The method combines a literature review with fieldwork, site analysis, sketch-based observation, and semistructured interviews with local experts. The analysis focuses on how variations in tree species, canopy cover, and street proportions influence microclimate, experiential values, and spatial configuration.

The results indicate that Mendoza's extensive tree-lined streets, in synergy with the acequia system, significantly contribute to urban cooling through shading and evapotranspiration, thereby improving thermal comfort in public space. However, several challenges emerge, including water scarcity, an ageing tree population, and tensions between aesthetic preferences and the need for more drought-tolerant species. The study also highlights how the spatial and sensory qualities of trees influence people's perception and use of the street environment.

The study concludes that Mendoza's integrated system of trees and open irrigation channels offers valuable landscape architectural lessons for climate adaptation in arid urban contexts. Ensuring long-term resilience will require a more diversified tree strategy, improved management practices, and a careful balance between ecology, aesthetics, and social acceptance.

ORAL Landscape architecture · Lincoln University, New Zealand · ID 144

Does designing gardens for wildfire risk reduction and biodiversity conservation promote residential action?

Nathan Campbell
Lincoln University

Wildfire risk and biodiversity loss are two significant issues in sprawling suburban development, especially the Wildland Urban Interface (WUI) where residential landscapes border vegetation or pasture. The Port Hills region in greater Ōtautahi Christchurch Aotearoa New Zealand has a rapidly expanding WUI that places thousands of homes at risk from wildfire. Fire is a natural process, but anthropogenic induced changes in climate, land-use, and fuel loads have resulted in increased wildfire frequency and severity, placing human and natural ecosystems at risk. As current wildfire management strategies can focus on risk aversion to the detriment of biodiversity, novel solutions are required to concurrently improve indigenous biodiversity and manage wildfire risk in the WUI. Our chosen method combined sociology, science, and design. We conducted semi-structured interviews with two groups: landholders in wildfire-affected suburbs of greater Ōtautahi Christchurch, and local experts in wildfire management and biodiversity conservation. Interviews aimed to identify the perceptions, opportunities, and limitations for wildfire risk reduction and biodiversity conservation. In addition, we conducted a scoping literature review to understand global research and policy for wildfire risk reduction. Interviews revealed eight key themes, including the value of community, importance of education and communication in reducing risk, and which limitations most inhibit the development of wildfire-safe, biodiverse communities in the WUI. Conceptual design scenarios combine international research and biogeographic interview data to provide novel recommendations for site-specific landscape design. Our research model is designed to be replicable, enabling development of landscape-level strategies to mitigate risk and (where practicable) increase biodiversity in wildfire prone landscapes worldwide. As urban sprawl and climate change continue to accelerate globally, it is vital that landscape planning embraces science-backed, people-driven landscape design models. Our study demonstrates how multi-disciplinary research can develop such models, paving the way for disaster resilience planning and biodiversity conservation.

ORAL Landscape architecture · Lincoln University, New Zealand · ID 209

Climate-Driven Changes in Habitat Suitability and Landscape Fragmentation of Red Panda (Ailurus fulgens) in Eastern Nepal

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Habitat loss and fragmentation are major drivers of biodiversity decline, particularly for species like red panda due to their narrow ecological requirements and limited dispersal capacity. Understanding changes in habitat suitability and landscape configuration is critical for effective conservation planning. This study aims to model the current and future habitat suitability of the species in eastern Nepal under climate change scenarios, and quantify the degree of habitat fragmentation, to assess habitat dynamics under changing environmental conditions. The study was conducted in the Panchthar–Ilam–Taplejung region of eastern Nepal using long-term red panda occurrence records. Habitat suitability was assessed using MaxEnt with future projections. Binary suitability maps were used to analyse habitat change and quantify fragmentation using landscape metrics. The selected model had precipitation of coldest quarter, elevation and distance to settlements as the most influential predictors. Current suitable habitat covered 843.62 km² which increased by 7-22% under future scenarios, with habitat gains consistently exceeding losses. However, suitability patterns shifted spatially, with habitat centroids moving 4.2-6.0 km northwest and 175-251 m upslope. Climate change is projected to redistribute and expand climatically suitable red panda habitat, while producing only modest changes in landscape configuration. Climate change is likely to expand suitable habitat for the red panda, while associated changes in landscape configuration are relatively modest. This highlights the importance of integrating habitat suitability with landscape structure in conservation planning. Conservation efforts should prioritize maintaining connectivity, protecting intact forests, and managing human disturbance, particularly in community-managed and transboundary landscapes.

ORAL Landscape architecture · UHOH - University of Hohenheim, Deutschland · ID 266

Innovating rice cultivation in Chile under water shortage and land competition

Marcelo Vicente Villa Rodriguez, Christian Troost, Hamil Uribe Cifuentes, Thomas Berger
University of Hohenheim

Rice cultivation in the Maule and Ñuble regions of Chile depends on continuous flooding, consuming up to 22,000 cubic metres of water per hectare each season. Documented water deficits, aggravated by anthropogenic drought, are making this demand increasingly unsustainable. At the same time, rapidly expanding perennial crops (particularly European hazelnut, which has grown from under 9,000 to nearly 50,000 hectares nationally since 2014) create growing competition for the same land and water resources. Whether conventional rice can remain economically viable for Chilean smallholders, and under what conditions novel systems become preferable, is an open empirical question.

This study conducts a whole-farm bio-economic simulation analysis of rice innovation and land-use competition for heterogeneous farm agents in Maule and Ñuble. Using the MPMAS software package, developed at Uni Hohenheim, farm-level mathematical programming is used to identify profit-maximising land-use portfolios subject to constraints on land, labour, capital, credit, and water availability. Innovations assessed include the System of Rice Intensification (SRI), drip-irrigated rice, and drone-assisted precision management for seeding and input application. These are evaluated against competing enterprises (hazelnut, cherry, maize, and livestock) across scenarios ranging from current water availability to severe drought conditions.

A mobile R-Shiny interface has been prepared for deployment in direct farmer elicitation sessions to captures tacit agronomic knowledge and validate model assumptions in the field. This participatory component ensures that the behavioural and institutional constraints governing adoption, such as Chile's tradeable water rights system, are accurately represented in the model.

Results will identify, for each farm typology, optimal production plans, the water-availability thresholds at which innovation adoption and land reallocation becomes rational, and policy-relevant implications for water governance and innovation promotion in the region.

ORAL Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 118

Den site selection of mesopredators in developing rural areas in Central Poland

Łucja Kuczyńska
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Rural areas undergo intensifying landscape transformations due to agricultural modernization and infrastructure expansion, which has a significant impact on wildlife activity and spatial behavior. The aim of the study was to assess how these anthropogenic changes, combined with natural habitat characteristics influence the distribution of badger (*Meles meles*), red fox (*Vulpes vulpes*) and raccoon dog (*Nyctereutes procyonoides*) dens in developing rural areas. The research was conducted in Central Poland. To verify predator habitat preferences, the locations of inventoried dens (N=53) were compared with randomly selected control points (N=106) within the study area. Distances from roads, buildings and water sources were measured using GIS tools. At each location, vegetation concealment was estimated using a cover board, and terrain slope was measured using a clinometer. Additionally, the analysis included environmental features, such as soil type, type of biotope, and the geographical directions of entries to the dens. The Mann-Whitney U test revealed no significant differences ($p>0.05$) in distances to anthropogenic and hydrographic objects between dens and control points. Den sites were located within denser vegatation and greater slope than control point ($p<0.01$). Chi-square analysis revealed that the distribution of den sites did not differ significantly from that of control points with respect to either biotope type ($p=0.366$) or soil type ($p=0.883$). The similar results of dens and control points indicate the high ecological plasticity of the studied species.

ORAL Landscape architecture · UNITUS - University of Tuscia, Italy · ID 124

Fear at the top of the food chain: a stress physiology perspective

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Fear is an emotional and physiological response through which organisms perceive and respond to threats. Persistent perception of risk can affect individual behavior and physiological state, ultimately influencing population dynamics, as extensively described in predator–prey systems within the framework of the ecology of fear. In this review, we aim to introduce a novel conceptual framework on the physiological and ecological role of fear in vertebrates, where fear is not exclusive to prey species but can also shape predators' behaviour. While current frameworks conceptualize the landscape of fear primarily as a vertical process in trophic interactions only (i.e., predator-prey), we aim to highlight that fear also propagates among apex predators (intraguild), and from human super-predators to apex carnivores and vice versa, creating a multidimensional landscape of fear across and within trophic levels that supports ecological functions and niche segregation.

In the Anthropocene, humans have emerged as super-predators, casting a pervasive landscape of fear through their actions. Nowadays, large carnivores are recolonizing former ranges from which they were eradicated, often overlapping with human activities. Human-induced fear in human-dominated landscapes may erode the functional ecological role of large carnivores by constraining their movement, hunting behaviour, trophic interactions, and prevail on intra-guild fear. At the same time, however, fear of humans may be one of the primary mechanisms driving spatial segregation at fine spatio-temporal scales and enabling coexistence between humans and large carnivores. In this contribution, we discuss how the application of animal physiology tools and concepts might be essential as an early-warning tool for detecting sublethal effects on predators and anticipating ecological outcomes, providing novel ways to address the impact of humans on wildlife.

POSTER Landscape architecture · SLU - Swedish University of Agricultural Sciences · ID 388

Are You Magnolia Mad? - A Literature And Field Study In England

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This study examines how spring-flowering magnolias are used and designed in literature and practice, focusing on their potential in parks, gardens, and urban environments. It combines a literature review with a field study conducted in southern England. The aim was to identify the design principles and areas of use described in the literature and compare them with observations of magnolias in real environments in southern England, a country with a long tradition of magnolia cultivation and use.

The literature review included dendrological literature, literature aimed at plant users, and scientific articles. The results show that the literature primarily discusses the placement of magnolias, their use as park and garden trees, and the importance of sheltered microclimates. Many references describe magnolias as specimen trees, often placed against dark or evergreen backgrounds to enhance their flowering display. Companion planting with rhododendrons, conifers, and other woodland plants is frequently recommended, although the literature provides limited guidance on planting design and composition.

The field study showed that magnolias are often used in more complex vegetation systems than described in the literature. Many functioned as spatial elements, focal points, or components of woodland-like environments rather than as isolated specimen trees. Seating areas, pathways, and experiential qualities were also frequently integrated into magnolia plantings, despite receiving little attention in the literature.

The study reveals both similarities and differences between literature and practice. Sheltered placement, dark backgrounds, and the importance of microclimates are common to both. However, magnolias are used in a more varied and integrated manner in practice than generally described in the literature. The findings suggest that spring-flowering magnolias have considerable potential in future urban green environments, particularly in response to climate change and the increasing need for biodiversity, spatial qualities, and aesthetic experiences in cities.

strong text

POSTER Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 392

A home garden concept for the elderly based on universal design

Sylwia Smoleńska

The population in Europe is aging rapidly. Because of this demographic shift, many seniors find their home gardens inaccessible and physically demanding over time. Private green spaces, which were once a source of joy, often change from a peaceful oasis into an architectural barrier. The presented concept of a home garden for the elderly is a direct answer to this growing problem. It is a thoughtfully designed space that actively supports their independence and encourages daily outdoor activity. The project is a ready-to-use model based strictly on the rules of universal design. In the gardening area, traditional ground planting was replaced by ergonomic, raised beds. This simple change means seniors do not have to bend down, which protects their health and makes garden work much easier. Furthermore, spatial barriers were completely removed by creating a safe, obstacle-free path system with hard, even surfaces. To reduce the daily workload, the traditional lawn area was made significantly smaller. Instead, a permeable gravel driveway was added. The garden also uses specific species of plants that require very little care and maintenance. The whole area includes small outdoor furniture and structures that encourage resting and relaxing outside. This solution is not just a beautifully designed space. Most importantly, it is a practical answer to future demographic challenges. This work proves that an innovative approach to landscape architecture can create a safe environment. It fits the needs and physical limits of seniors, giving them easy and effortless contact with nature.

POSTER Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 394

Landscape design of the surroundings of the Śródmiejski Ośrodek Sportu by the Rozbrat 26 Street in Warsaw

Oliwia Wiącek
Warsaw School of Life Sciences

This thesis presents a landscape design of the surroundings of the Śródmiejski Ośrodek Sportu at 26 Rozbrat Street in Warsaw. The design section is based on increasing accessibility for pedestrians and enhancing its representative function, as well as incorporating solutions that mitigate climate change and prevent its adverse effects. With regard to the social aspect, the accessibility of the site for pedestrian users has increased thanks to new functional zones, while also providing them with opportunities to engage in recreational activities through the use of new amenities.

With regard to ornamental qualities, the space has gained greater attractiveness thanks to the expansion of the vegetation layout through newly introduced tree plantings and the use of ornamental flower beds. With regard to climate change mitigation and adaptation, the site supports stormwater retention through an increased proportion of permeable surfaces. With regard to ecological functioning, an additional advantage is the increased proportion of biologically active area, as well as an increased number of plant species, which enhances biodiversity and provides habitat for small animals, including pollinators.

In the design, in order to avoid conflicts and the inability to maintain a safe distance of 2m between underground installations and the proposed trees, technology was applied to protect underground networks from damage caused by roots at greater depths.

POSTER Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 373

Concept Design of a Residential Edible Garden

Natalia Trojanek
Warsaw University of Life Sciences

In an era of rapid urbanization, climate change, and biodiversity loss, society is becoming increasingly disconnected from nature. Consumer lifestyles and mass food production have reduced awareness of food origins and ecological processes, negatively affecting human health, environmental awareness, and the development of younger generations. In response, there is growing interest in self-sufficiency and integrating nature into everyday living spaces. This residential edible garden project reflects this approach by emphasizing the creation of local ecosystems near homes.

The project aims to develop a multifunctional space with both recreational and educational value for adults and children. Detailed habitat analyses were conducted before the design process to assess the site's environmental conditions and potential. The concept was based on user expectations, focusing on key qualities such as edibility, functionality, aesthetics, and a clear division between passive and active recreation zones.

The design follows a naturalistic aesthetic, with a strong emphasis on native wild edible plant species. This approach simplifies maintenance while supporting the local ecosystem. The garden combines the practical benefits of a kitchen garden with the visual qualities of an ornamental garden, creating a safe and attractive habitat for people, birds, and beneficial insects.

Beyond its aesthetic and culinary value, the garden serves an important educational role. It encourages daily interaction with nature, promotes responsibility, and enables children to observe plant growth cycles firsthand. As a result, the edible garden supports holistic development, healthy lifestyles, and pro-environmental attitudes within the local community.

POSTER Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 353

Concept for the development of the site of the former Sira factory in Sieradz with the adaptation of a disused railway siding

Amelia Przybyłek

This study presents a concept for the revitalisation of a post-industrial area located on the site of the former "Sira" factory in Sieradz, including sections of a disused railway siding. The aim of the project is to transform this degraded site into a publicly accessible green space that combines environmental, social and cultural values while preserving its industrial heritage. The concept was developed based on analyses of the site's spatial, environmental and historical conditions, a dendrological inventory, and an assessment of users' needs, resulting in a comprehensive design proposal that addresses contemporary challenges associated with the regeneration of post-industrial sites. Preserved elements of the former railway infrastructure have been incorporated into the spatial layout as visible reminders of the site's industrial past, reinforcing its landscape identity. The project also seeks to preserve existing natural assets and enhance them through the introduction of native plant species, thereby promoting biodiversity and strengthening ecosystem resilience. A key element of the proposal is a water garden that performs both recreational and educational functions, enabling visitors to observe natural processes, the development of aquatic vegetation, and the role of water in shaping the landscape. Based on the principles of sustainable landscape design, the project aims to create an attractive, functional and year-round public space that encourages recreation, social interaction and contact with nature. Furthermore, its implementation is expected to improve environmental quality by increasing biologically active surfaces, expanding green infrastructure, enhancing biodiversity, and improving rainwater retention.

POSTER Landscape architecture · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 44

Visual Transformation of Funerary Space in Landscape Architecture

Lucia Kopásková

This master's thesis focuses on the complex revitalization and spatial transformation of the old cemetery in the cadastral area of the village Nezbudská Lúčka, emphasizing its functional connection with the immediate surroundings. The area is dominated by a flooded quarry—the only natural asphalt deposit in Europe—as well as nearby castles, traditional timber rafting sites, and scenic panoramas. The primary objective of the project is the sensitive integration of three key elements: the historical cemetery space, the natural quarry area, and an existing industrial brownfield. The aim is to create an organized entity that respects the principles of natural succession and environmental sustainability. The methodology is based on thorough site mapping, analysis of historical contexts, and identification of the current needs of the municipality, serving as a foundation for the proposed visual transformation of the site. The resulting project converts the neglected area into a functional zone that bridges the historical legacy of the location with new opportunities for social use, thereby enhancing the quality of life for local residents and the aesthetic value of the broader landscape.

POSTER Landscape architecture · BOKU University, Austria · ID 84

From gardens to forests: microplastic fingerprints in urban soil systems

Julius Jäkel, Katharina Keiblinger, Martin Schneider

Urban soils are increasingly recognized as sinks for microplastic (MP) particles, yet information on their abundance, size distribution and polymer composition remains limited. Here, community gardens are relevant study sites as they combine local food production with diverse potential plastic inputs, including compost, gardening materials, and diffuse atmospheric deposition. This study investigated MP contamination patterns in Vienna's urban community gardens and compared them with forest soils from the Viennese Forest and compost samples as potential reference and input materials.

Topsoil samples from twelve community gardens were grouped into inner-city and outer-city sites based on daily citizen density and anthropogenic activity. Forest soils were used as semi-natural reference sites. MP particles were extracted using density separation and chemical digestion, followed by filtration and FTIR microscopy for particle identification and polymer classification.

The results showed clear differences among site groups. Outer-city soils contained the lowest MP abundances, whereas inner-city gardens, forest soils and compost samples showed higher particle numbers. Forest soils were dominated by small particles below 62 µm, suggesting that atmospheric transport, canopy interception and subsequent transfer to the topsoil may be important accumulation pathways. In contrast, outer-city gardens showed proportionally higher contributions of larger particles, indicating more localized inputs from garden management or plastic residues.

Polymer composition further supported the presence of mixed sources. EVAc and PU contributed strongly across several groups, while PVC was more prominent in inner-city soils. Higher abundance of PE, PA and PP in outer-city gardens point towards inputs from films, synthetic fibres, plant containers or plastic tools. Overall, the study demonstrates that MP contamination in urban soils cannot be interpreted from abundance alone. Combining particle numbers with size distribution and polymer composition provides a more informative basis for identifying potential sources and understanding MP accumulation in urban and semi-natural soils.

POSTER Landscape architecture · SGGW - Warsaw University of Life Sciences, Poland · ID 357

A Concept for a Neighbourhood Integration Park in the Suburban Zone of Warsaw in the Context of Ecologically Valuable Landscapes

Julia Wróblewska

Shaping public space in the immediate vicinity of naturally valuable areas is the main design challenge and the subject of my work, the answer to which is the design of a neighborhood integration park in the Karczew – small municipality near Warsaw. The development area serves a key role as a green link between dense residential development and the buffer zone of the Masovian Landscape Park (regional park). The main design goal was to strike a balance between pedestrian and recreational use and the protection of the sensitive ecotone ecosystem.

The functional solutions employed result directly from an analysis of the local community's needs, conducted using the CAWI survey method. It was precisely the high demand from residents for meeting places and animal facilities that led to the introduction of functional and spatial zones, including a fenced dog park and a community garden. This division allows for traffic management and protection of the most valuable sections of the sandy grasslands from excessive pressure.

The design is based on the concepts of "intentional wilderness" and managed succession. This choice was dictated by the desire to preserve the existing pine and bird cherry stands. The abandonment of impermeable surfaces in favor of mineral paths stems from concern for the local hydrological cycle and biodiversity. Instead of dominating the surroundings, small-scale architecture made of natural materials is intended to blend harmoniously into the landscape, becoming a "discovered find."

Integration points, such as geometric gazebos, amphitheatrical steps, and an analemmatic sundial, act as catalysts for neighborly bonds and foster spontaneous interactions. A community garden with planters of varying heights promotes inclusivity, enabling people of all abilities to engage in shared activities. The project demonstrates that well-thought-out landscape architecture can effectively build social capital while promoting respect for wildlife.

POSTER Landscape architecture · BOKU University, Austria · ID 253

Economies of of care sustaining research exchange and cooperation – Storytelling with APPEAR scholars at BOKU

Sina Buczolich

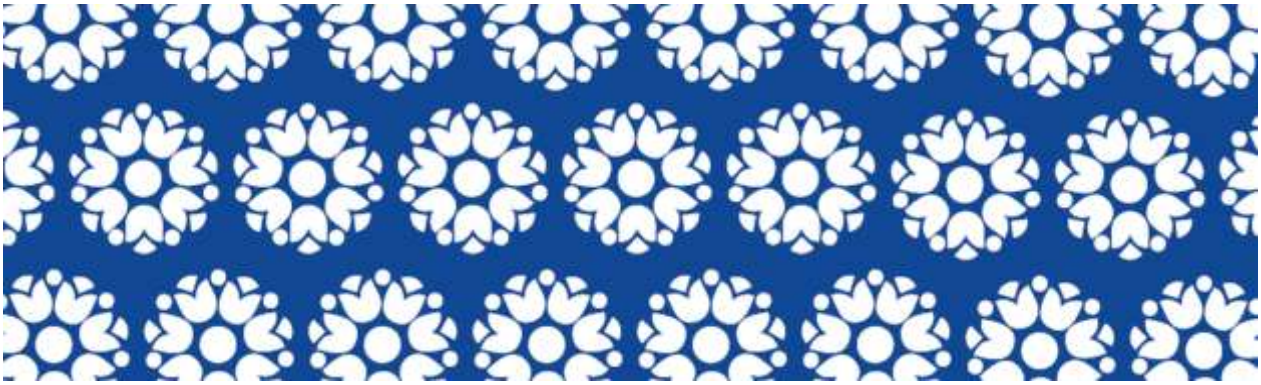
At Austrian universities, many non-EU/EEA students join during a central phase of their academic careers. At the Institute of Development Research BOKU, we engage closely with scholars participating in the Austrian Partnership Programme in Higher Education and Research for Development (APPEAR) – which supports doctoral students through scholarships while fostering scientific partnerships between Austrian and partner-country institutions. Although the students are provided with a scholarship for the completion of their studies and are frequently embedded in a research community, they face many challenges throughout their stays. These include being far from their home environment, requiring either relocation with their children or enduring long separations from their families, and persistent administrative burdens, notably the frequent renewal of residence permits. In the case of BOKU, different economies of care are formed during an APPEAR student's stay abroad, for instance with colleagues in Austria or through care relations to their home communities. These economies of care influence their ability to overcome persistent barriers. Using storytelling as a method, and with the help of APPEAR scholars' narrative perspectives, this thesis aims to explore the often precarious situations these scholars find themselves in, but also the relations to communities they are connected to at home and those formed during the stay. The thesis will analyse the role these mostly invisible and informal economies of care play in the successful completion of a PhD.

POSTER Landscape architecture · WUR - Wageningen University & Research, Nederlands · ID 135

Testing the green backlash hypothesis: Local electoral effects of the EU ETS in the 2024 elections in Flanders

Tine Van Dyck

Carbon pricing under the European Emissions Trading System (EU ETS) is a cornerstone of the European Green Deal to tackle climate change. Recent debates on a potential 'green backlash' claim that increasingly stringent climate policies may provoke electoral punishments, contributing to the rise of populism in the European Union over the past decade. While the ecological effectiveness and socioeconomic impacts of the EU ETS have been studied for its earlier phases, the impacts of the carbon price spike at the start of phase four are insufficiently understood. Therefore, this thesis investigates whether exposure to the EU ETS during the unexpected 2021 carbon price spike affected voting behavior between the 2019 and 2024 elections by exploiting uneven exposure to ETS-regulated firms across Flemish municipalities. The analysis applies a matching difference-in-differences design comparing ETS-exposed with ETS-unexposed municipalities while ensuring parallel trends and accounting for the contemporaneous energy crisis as a confounder. The results of this thesis suggest that there is no evidence for the presence of a green backlash in this context, as vote shares for populist, green, and incumbent parties are unaffected by ETS exposure during the price spike. Consistent with this, the channels of the green backlash framework cannot be observed, as no socioeconomic costs could be identified at the municipal level. These findings point to compensation measures, policy complexity, and awareness of other issues, such as migration and high energy prices, as factors that may have dampened potential effects and the salience of carbon prices to voters. It suggests that the energy crisis as a driver of voting behaviour in 2024 must be further investigated. Overall, this thesis adds nuance to the debate on the green backlash and highlights the need for further research to allow for a general conclusion and explore alternative mechanisms.



TRACK

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ORAL Natural Resources · UHOH - University of Hohenheim, Deutschland · ID 274

Exploring reconciliation pathways of commercial fisheries management and seabird conservation: An analysis on maximum sustainable yields of seabird prey stocks

Tobias Aigner
University of Hohenheim - EnvEuro

Forage fish occupy a critical intermediate trophic position in marine ecosystems and represent a key resource for seabird breeding success. Cury et al. (2011) illustrated consistently declining seabird breeding productivity below abundances of one third of maximum historical fish stock biomass (B1/3), suggesting a quantitative conservation threshold. Commercial fisheries management, however, is predominantly guided by maximum sustainable yield (MSY) targets, and the compatibility of these targets with the B1/3 threshold remains poorly examined at a fish

stock scale. This study assessed the sustainability of spawning stock biomass management targets (SSBmsy RPs) relative to Cury's threshold (B1/3 RP) for 70 globally distributed forage fish stocks. A Seabird Sustainability Index (SSI) was introduced as the ratio of SSBmsy RP to B1/3 RP. Additionally, stock-wide biomass densities were derived. The RP relationship, the effect of time series length, density translation adequacy, and the influence of qualitative stock variables were examined. The median SSI of 1.131 indicates that SSBmsy targets are on average sufficient to sustain reproductive success, yet 39% of stocks displayed an SSI < 1. However, only 46% of stocks recently exceeded their SSBmsy target, and 41% had recent SSB estimates below the B1/3 RP, indicating prey abundances associated with reduced seabird breeding success. A potential influence of time series length on the SSI was observed, consistent with the shifting baseline syndrome, though explanatory power remained weak. Density medians ranged from 0.331 to 0.493 MT/km² and revealed a strong negative relationship with stock area size. Qualitative variables explained rather management structures than ecological drivers. These findings highlight that current management targets are only partially aligned with seabird conservation needs and that consistent implementation of management targets would represent a meaningful improvement for fisheries sustainability and seabird

conservation. The B1/3 RP is proposed as an conservation threshold within a broader ecosystem-based management framework.

ORAL Natural Resources · SLU - Swedish University of Agricultural Sciences · ID 337

Regenerative Transitions in the Tropical Andes

Wilma Lagerman
Swedish University of Agricultural Sciences

Pointed to as South America's largest water source and a priority region for conservation planning and research, the tropical Andes of today face compounding socio-ecological challenges linked to land use practices. Agriculture and mining interests have resulted in significant replacement of tropical forests, water contamination, soil erosion and social conflict – while changes in weather patterns are rapidly altering conditions for life on the Andean mountains.

This study investigates agricultural transitions to soil health-enhancing practices within the municipality of Támesis, Southwestern Antioquia, Colombia. Intersecting complexity thinking with inquiry into the lived experience of transitioning farmers, this study employs qualitative methodologies in crafting a metaphorical map of the strategic landscape for transitions. Among the findings are six possibilities and six barriers.

While a variety of factors serve as attractors to initiate transitions journeys in the territory, the main mechanism reinforcing the new practices was found to be an experience of the ecosystem responding to care – of ecological reciprocity. That the strongest stabilising attractor was found to be eco-relational in nature – as well as to arise from, rather than before the practices – has sincere implications for understanding agroecological transitions.

The study concludes with four strategic nudges, actionable for local organisations and farmers engaged in expanding regenerative transitions in the territory: Equipping early adopters to increase visibility of successful alternatives and stimulate incentivising markets; strategic design focusing on gradual transitions and what is most adjacent for local farmers to apply; empirical remembrance for soil awareness; and framing regeneration in language close to farmers' own worlds.

ORAL Natural Resources · NMBU - Norwegian University of Life Sciences · ID 24

Cumulative effects – The challenges of the principle in Norwegian land and nature management

Ronja Daniloff
NMBU

Cumulative effects is a legally established principle enshrined in Section 10 of the Norwegian Nature Diversity Act. Its purpose is to prevent a gradual degradation of nature. In practice, the principle is reflected in the assessment of a project's environmental impacts – not only in isolation, but also in the context of the cumulative burden already affecting the area. However, cumulative effects remain a challenging principle to assess -both for Norwegian authorities and environmental impact assessors. This master's thesis investigates the following research question through document analysis and semi-structured in-depth interviews with nine informants:

"What challenges are found in the definition, legal framework and methodology of the principle of cumulative effects?"

The thesis also examines the geographic scales at which these assessments are recommended. A regional wind power case is used to illustrate some of these challenges.

The findings show that there is no clear definition or consistent use of terminology among the authorities regarding cumulative effects. It's also unclear whether cumulative effects in accordance with Section 10 of the Nature Diversity Act and "the combined effects" in accordance with Section 21 of the Regulations on impact assessments refer to the same principle. While various guidelines mention cumulative effects, the methodologies vary and are rarely detailed. There is disagreement among informants and in the documents about which assessment topics, influencing factors, and geographic scales should be applied in such evaluations.

To ensure the principle fulfils its intended function, it is essential that it is clearly defined and assessed at a relevant geographic scale. Whoever holds responsibility for coordinating cumulative assessments at larger spatial levels remains unresolved. Although informants agree that a regional cumulative impact assessment of the thesis's case should be carried out, the Norwegian Water Resources and Energy Directorate currently has no plans to initiate such an assessment.

ORAL Natural Resources · WUR - Wageningen University & Research, Nederlands · ID 345

Temporal Shifts in African Elephant Space Use: Links to NDVI Dynamics in Gonarezhou National Park

Alissa Mocking-Timmerman

Animal space use reflects the interaction between resource availability, behaviour and population dynamics. It can change under increasing population density due to density-dependent foraging pressure. We examined whether a growing elephant population alters space-use patterns over time by analysing hotspot dynamics of African elephants (Loxodonta africana) in Gonarezhou National Park (GNP), Zimbabwe, across five dry seasons between 2016 and 2024. During this period, elephant density increased from ~2.17 to ~2.48 individuals/km2. Increased population density can cause vegetation decline through repeated grazing, thereby reducing vegetation greenness measured by Normalized Difference Vegetation Index (NDVI). Using GPS collar data from 34 individuals, we identified individual hotspots (using dynamic Brownian Bridge Movement Models) and derived residence time, travel time, revisitation interval and number of hotspots. We then tested whether these hotspot dynamics changed over time and were related to vegetation greenness (NDVI), hotspot size, distance between hotspots, or rainfall. Hotspot dynamics remained largely stable across the study period. The temporal effect was limited to 2022-2023, when revisitation intervals and travel times became significantly longer. Hotspots had significantly higher NDVI than the surrounding landscape, suggesting active selection for greener areas. The difference in NDVI between hotspots and surrounding landscape declined over time, showing vegetation homogenization and suggesting that spatial memory may play an important role when selecting hotspots. However, NDVI did not significantly predict any movement metrics. Hotspot size was the dominant predictor for all movement metrics, as larger hotspots were associated with longer residence times, fewer hotspots and shorter revisitation intervals. These findings suggest that in this water-limited savanna, (semi-)fenced areas, landscape structure and spatial memory, rather than vegetation greenness or density-driven depletion, are the primary drivers of elephant dry-season space use.

ORAL Natural Resources · UHOH - University of Hohenheim, Deutschland · ID 240

Gender Success Unveiled: Through GATE Success Framework - Gender Dimensions of Adopting Artificial Insemination Technology: Case Study of Smallholder Cattle Systems in Uganda

Sarah Waltrová[1], Regina Birner[2], Jana Mazancová[3], Viviane Yameogo[2]

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Understanding technology adoption requires moving beyond adoption itself and examining what makes adoption successful, sustainable, and socially embedded within household systems. While research on artificial insemination (AI) in livestock production has commonly focused on adoption rates and economic outcomes, adoption alone does not constitute success. This study investigates the gender dimensions influencing the adoption and continuous use of AI technology in smallholder dairy systems in Uganda, addressing a key research gap due to limited gender-disaggregated data in African agricultural innovation research.

The study develops the GATE Success Framework, a multidimensional framework consisting of four interconnected stages: Adoption Success, Technology Success, Gender Success, and Empowerment & Equity Success. Developed inductively from empirical findings in three Ugandan districts—Bunyangabu, Masaka, and Mpigi—the framework represents the main conceptual contribution. The analysis draws on case studies, focus group discussions, and participatory process net maps.

The findings demonstrate that adoption success and technology functionality create the conditions under which gender success, and ultimately empowerment and equity, can be achieved. Across all districts, successful AI adoption was strongly associated with woman-based or joint decision-making, equitable labour organization, and household cooperation. Households that discussed decisions together, redistributed labour, and collectively addressed challenges were better able to withstand technical, financial, and institutional constraints. In contrast, households characterised by rigid gender roles, concentrated decision-making authority, unequal labour burdens, or discouragement following failed insemination attempts were more likely to discontinue AI use.

The GATE Success Framework provides a conceptual model and practical tool for integrating gender-sensitive approaches into research, policy, service provision, and development interventions, contributing directly to SDG 5 (Gender Equality) and SDG 9 (Innovation). Ultimately, the study reveals the hidden power of gender in agricultural innovation adoption: gender dynamics influence not only who benefits from technology, but whether the technology functions and is sustained at all.

ORAL Natural Resources · SGGW - Warsaw University of Life Sciences, Poland · ID 29

Medical training of captive zebras as a modern approach to animal welfare in zoos.

Lena Nawrot
Warsaw University of Life Sciences (SGGW), Poland

Modern zoological gardens increasingly focus on improving animal welfare through voluntary cooperation between animals and keepers. One of the most important tools supporting this approach is medical training, which allows animals to participate in basic veterinary and husbandry procedures with reduced stress. The aim of this study was to evaluate the susceptibility of zoo-housed zebras to medical training and to assess its potential impact on animal welfare.

The study was conducted on five zebras kept in zoological gardens. The animals were trained using positive reinforcement techniques and voluntary participation, without the use of physical coercion. During the research, several aspects of the training process were analyzed, including the number of sessions required to learn specific commands, the frequency of stress-related behaviors, and the number of correctly repeated behaviors during training sessions.

The results showed that all studied zebras were capable of learning medical training behaviors, although individual differences in learning pace and behavioral stability were observed. Stress-related behaviors were most visible during the initial stages of training, but their frequency decreased as the number of sessions increased. At the same time, the number of correctly performed repetitions increased, suggesting adaptation to the training procedures and growing confidence toward keepers. The findings also indicated that positive reinforcement played a major role in maintaining learned behaviors.

The study demonstrates that medical training can be an effective welfare-supporting tool in modern zoos. Besides facilitating veterinary care, training may also provide behavioral enrichment, reduce boredom, and help minimize the risk of stereotypic behaviors in captive wild animals.

POSTER Natural Resources · UHOH - University of Hohenheim, Deutschland · ID 12

Integrating biobased materials in fashion: value creation and adoption within the bioeconomy

Sarah Elise Hornby
University of Hohenheim

Biobased materials are increasingly promoted as alternatives to fossil-based fibers and plastics, but their adoption in fashion remains uneven. This study examines how designers, material developers, and supply-chain actors work with biobased materials in practice and what conditions shape whether these materials can move beyond experimentation.

The research is based on a focused literature review, semi-structured expert interviews, and case-based analysis. It considers several material families, including regenerated cellulose, chitosan biopolymers, algae-based materials, biobased polymers, and bast fibers. Interview and case material were analyzed through five value dimensions: ecological, functional, aesthetic and experiential, capability-based, and relational value.

The findings show that successful integration does not depend on identifying one "best" material. Instead, biobased materials need to become reliable, producible, testable, and meaningful within existing design and production systems. A renewable origin can support ecological value, but it does not automatically make a material sustainable. Sourcing, processing, chemical inputs, end-of-life options, and verification all shape how sustainability claims should be judged. Functional value is equally important, since materials must perform reliably in use and fit existing machinery before they can be adopted commercially.

The study also shows that adoption in fashion depends on more than technical performance. Materials must be desirable to designers and consumers, while brands need credible evidence to avoid vague or misleading sustainability claims. The Orange Fiber and TENCEL™ Limited Edition x Orange Fiber case illustrates this point: citrus-processing by-products can enter a regenerated-cellulose textile pathway, but only through processing infrastructure, quality systems, supply-chain partnerships, and transparent communication.

Overall, the study shows that biobased materials gain value through the systems that make them usable, credible, and desirable in fashion.

POSTER Natural Resources · UHOH - University of Hohenheim, Deutschland · ID 221

The role of citizen science in urban biodiversity governance - A comparative study of German and Swedish cities

Alina Strangfeld

University of Hohenheim

Biodiversity forms the foundation of resilient ecosystems, a stable climate and human well-being. With ongoing urbanization, protecting biodiversity in cities has become increasingly important. Ef fective monitoring is essential to understand dynamics and the condition of the environment, and to enable informed conservation measures. In this context, citizen science (CS) can provide valuable additional data through observations collected by the public. However, despite its growing popular ity and the increasing availability of data, it remains unclear to what extent CS data is actually used by city authorities. This study explores whether and how CS data is used in municipal biodiversity management and how it is translated into practical measures. It compares approaches in Sweden and Germany following a comparative qualitative research design. The four selected cities Stockholm, Uppsala, Cologne and Bielefeld were analysed using a document research and semi-structured in terviews with city representatives. CS is used in all cities for conservation measures, planning deci sions and raising environmental awareness. In Sweden, CS is strongly institutionalized and inte grated into everyday practice through the centralized platform Artportalen. By contrast, the CS plat form landscape in Germany is more fragmented and used in project-based, species-specific contexts often with a stronger emphasis on awareness-raising. Overall, the study suggests, that CS is becom ing an increasingly important resource for biodiversity governance. At the same time, it remains a complementary data source alongside professional monitoring and always requires careful interpre tation.

POSTER Natural Resources · University of Lleida, Spain · ID 185

LegITIMadaEduLab: Developing Scientific Inquiry Skills Through Sustainability-Oriented Agricultural Scenarios in Pre-Service Teacher Education

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Climate change and sustainability challenges require citizens capable of understanding environmental issues and making informed decisions based on scientific evidence. As future educators play a key role in promoting sustainability awareness among younger generations, teacher education programs should provide learning experiences that foster scientific literacy and engagement with sustainability problems. Inquiry-based learning is recognised as a fundamental component of science education because it enables learners to investigate phenomena, interpret evidence, and construct scientific knowledge. However, implementing authentic inquiry experiences in teacher education remains challenging. Virtual laboratories have emerged as promising tools that support inquiry through interactive environments where learners can explore scenarios, analyse evidence, and investigate scientific phenomena. This study presents LegITIMadaEduLab, a virtual inquiry-based laboratory developed within the LegITIMada research project. The laboratory was designed to engage pre-service teachers in guided scientific inquiry through the exploration of sustainability-related agricultural scenarios. The aim of this study was to analyse the scientific inquiry skills demonstrated by pre-service teachers during a inquiry-based learning experience. The intervention involved 79 pre-service primary school teachers from the University of Lleida (Spain), who completed a guided inquiry activity supported by the virtual laboratory. Scientific inquiry skills were assessed through a structured worksheet evaluating three dimensions: identification of research questions, formulation of hypotheses, and data analysis leading to scientific explanations. Results indicate that participants demonstrated scientific inquiry skills across all dimensions. Strong performance was observed in the identification of research questions and in data analysis leading to scientific explanations, whereas hypothesis formulation represented the most challenging inquiry practice. These findings suggest that virtual laboratories provide valuable opportunities for developing scientific inquiry skills while fostering awareness of sustainability-related challenges. Furthermore, the results highlight the potential of virtual inquiry-based environments to support education for sustainable development, preparing future teachers to address environmental issues through evidence-based reasoning and science teaching.

POSTER Natural Resources · SLU - Swedish University of Agricultural Sciences · ID 175

Navigating Change: Investigating Environmental and Social Challenges in the Reconquista River Basin, Buenos Aires

Sannah Gallén[1], Klara Skärskog[2]

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Urban areas play a significant role in driving climate change, while simultaneously being highly exposed to its consequences. Cities are likely to experience challenges such as rising sea levels, increased flooding, and more extreme temperature variations. These pressures tend to impact vulnerable groups in society. Where residents of informal settlements constitute a particularly vulnerable group, as the settlements are often located in environmentally exposed or polluted areas.

This study examines the relationship between gender, community engagement, and environmental sustainability within the context of the Reconquista river basin in Buenos Aires, Argentina. As urbanization and climate change pose significant challenges to cities, particularly in low-income countries, this research focuses on the socio-environmental issues prevalent in one of the most affected areas along the river, characterized by dense populations and fragmented municipal governance. This thesis analyzes the current blue-green infrastructure and the political and social landscapes surrounding the river by utilizing various qualitative research methods—including literature reviews, Travelling transect, interviews, and action research. The role of local communities, notably women from San Martín are essential actors in managing green infrastructure and advocating for their neighborhoods. It clarifies how participatory approaches can influence sustainable urban development and river management practices to address ecological restoration and community empowerment in the face of climate change.

The findings show the critical importance of integrating the community and their insights into planning processes to foster resilience and sustainability in urban landscapes. It also highlights the woman's role within community development, how they carry valuable insights about their neighborhood, and play a key role in shaping local spaces.

POSTER Natural Resources · SLU - Swedish University of Agricultural Sciences · ID 177

Scenario-Based Modelling of Ecosystem Service Changes under Future Climate and Land-Use Scenarios in the Nissan Watershed, Sweden

Lara Thier

Climate change and land-use change can affect ecosystem services, including the capacity of watersheds to regulate water, retain soil and provide access to nature. This thesis explores how different future land-use pathways could influence these ecosystem services in the Nissan watershed in southwestern Sweden by 2060.

The study is based on stakeholder workshop narratives from Gislaved and Oskarström/Halmstad municipalities, developed within the Room4Water project. These local narratives were connected to broader global and Nordic future pathways to create four contrasting scenarios. The scenarios differ in how strongly society coordinates land-use decisions and whether adaptation mainly relies on nature-based solutions or grey, technical infrastructure. The narratives were then translated into land-use maps and analysed with ecosystem service models. The focus was on three indicators: sediment export, which shows where eroded soil may reach streams; quickflow, which represents fast surface runoff after rainfall; and urban nature balance per capita, which compares accessible green space with local population demand.

The results show clear differences between the four scenarios and across the watershed. Scenario 1, with coordinated governance and nature-based adaptation under lower climate pressure, generally showed the most favourable outcomes. It reduced sediment export and quickflow and had the smallest decline in access to urban nature. Other scenarios showed stronger pressures, especially where land cover changed towards arable land, artificial surfaces or young and clear-cut forest. Access to urban nature declined in all scenarios, showing that green space benefits depend not only on how much nature exists, but also on where people live. Overall, the study shows how scenario-based mapping can help compare possible futures and identify areas where land-use decisions may support or weaken ecosystem services.

POSTER Natural Resources · BOKU University, Austria · ID 210

Statistical Approach to Glide Activity of Different Regions Using Swiss, US and Austrian Data

Sebastian Dold

Glide-snow avalanches are characterized by the full-depth sliding of the snowpack and pose a significant and unpredictable natural hazard in mountain environments. Unlike other avalanche types, they are not triggered by external forces but driven by complex interactions between meteorological conditions and snowpack properties. Especially the formation of a basal water layer plays a crucial role. Currently, the lack of comparative research across different climatic regions limits the development of generalizable forecasting tools. This study investigates the key predictors of glide-snow avalanches by applying machine learning techniques, including Decision Trees and Random Forests, to historical meteorological data and avalanche observations from three distinct regimes: Planneralm (Austria), Montana (USA), and Davos (Switzerland). Further reserach may include Norway, Arlberg (Austria) and Mooserboden (Austria), although this is dependend on data availability. The models demonstrate high recall rates, successfully identifying the majority of avalanche events across all sites. Although showing universally high false alarm rates, which occurs with highly imbalanced hazard datasets. Crucially, the cross-site synthesis reveals two distinct avalanche prediction regimes. Switzerland represents a snowpack-threshold regime, where total snow depth is the overwhelmingly dominant predictor, acting as a necessary precondition for avalanche release. Conversely, Montana and Planneralm exhibit a thermally-driven regime. In these locations, temperature variables, including long-term mean temperatures and seasonal timing, have strong influence. They act as the primary discriminators, reflecting the critical role of warming and melt-freeze cycles. These findings highlight glide-snow avalanche prediction cannot rely on a single universal model. Robust operational early warning systems must be region-specific and calibrated to the dominant physical drivers of the local climatic regime. Future research should aim to integrate these site-specific statistical thresholds with physical snowpack models to improve precision and support local avalanche warning services

POSTER Natural Resources · BOKU University, Austria · ID 224

BioBrick - Bio-Based Composite Building Blocks for Interior and Structural Applications

Stefan Öttl, Ella Baier, Thomas Rainer, Jakob Scherf

The increasing pressure on the environment and natural resources requires sustainable solutions, particularly in the construction sector, which accounts for a significant share of resource consumption, waste generation and almost 40 % of the greenhouse gas emissions in Europe. Wood-based materials play a key role, as they can store CO_2 over long periods and replace emission-intensive materials. However, the full potential of wood is not yet utilized, as by-products are often used for energy recovery.

This project focuses on the development of a wood-based building block made from by-products along the wood processing chain combined with other biogenic agricultural and forestry waste streams. The building block called "BioBrick" enables long-term CO_2 storage, reduces the use of resource-intensive construction materials and is fully recyclable. Even when considering only the Austrian wood-processing industry, the potential annual CO_2 savings are approximately 23 million tonnes. Furthermore, with our developed de-bonding and re-pressing process, the material can be recycled and reused without significant loss of quality. The production process is cost-efficient, automatable and scalable. The BioBrick therefore combines regional raw materials, circular economy principles, and high resource efficiency in sustainable construction.

The key performance characteristics of the BioBrick are:

1 Material made from regional, renewable raw materials

2 Material with long-term CO_2 storage capacity

3 Circular (fully recyclable) material

Prototypes of the bio-based wall block have already been produced, tested and constructed into small wall sections. Test results have shown that the mechanical properties are adequate for use in interior applications and potentially even for load-bearing wall systems. Patent applications for the material processing, manufacturing process, and recycling process are currently underway. The aim of the project is to further develop this material within the framework of a doctoral research program while simultaneously establishing a start-up company.

POSTER Natural Resources · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 172

Using Open Biodiversity Data to Predict Climate-Driven Range Shifts in Carrion Beetles (Coleoptera: Silphidae: Silphinae)

Elena Sevidova, Andrea Lněničková

Climate change is expected to alter species distributions worldwide, yet predicting these changes remains challenging, particularly for invertebrates with incomplete distribution records. Carrion beetles of the subfamily Silphinae are ecologically important decomposers involved in nutrient cycling, and their occurrence is often closely associated with environmental conditions. Understanding the factors shaping their distribution is therefore essential for predicting how these species may respond to future climatic change.

The increasing availability of open-access biodiversity records has created new opportunities for large-scale ecological analyses. At the same time, the heterogeneous nature of these datasets raises questions regarding data quality, sampling bias, and the reliability of resulting predictions. Assessing the reliability of publicly available occurrence records is therefore essential for improving ecological forecasting.

This study will investigate selected Silphinae species representing a range of geographic distributions and ecological requirements. Species distribution models will be developed using publicly available occurrence records obtained from biodiversity databases together with climatic and environmental variables. Two modelling approaches, MaxEnt and Random Forest, will be applied to predict current distributions and future habitat suitability under selected climate scenarios. Model performance will be evaluated using Area Under the Curve (AUC) and True Skill Statistic (TSS) metrics and validated against independently curated occurrence records obtained from museum collections and field surveys.

By integrating biodiversity informatics with ecological modelling, the study aims to evaluate whether open-access biodiversity data provide a reliable basis for predicting climate-driven range shifts in carrion beetles. The results are expected to reveal whether model performance varies among species with different range sizes and levels of data availability, and to identify the conditions under which publicly available occurrence datasets provide reliable predictions of climate-driven range shifts.

POSTER Natural Resources · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 146

Long-term invasion trends of Alpine dock (Rumex alpinus) above the timberline in the Krkonoše Mountains (Central Europe)

Lukáš Kysela

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Arctic–alpine tundra ecosystems are among the habitats most vulnerable to biological invasions. This study investigates the long-term invasion dynamics of Rumex alpinus above the timberline in Krkonoše National Park (Czech Republic). The primary objectives were to map its current distribution, identify invasion hotspots, and evaluate long-term changes in its occurrence.

Field surveys utilized high-precision GNSS mapping to determine the current distribution of Rumex alpinus. To investigate potential drivers of invasion success, vegetation structure (LAI index), soil microclimate (three soil temperatures and soil moisture; TOMST dataloggers), and nutrient availability (PRS probes) were assessed across 174 sampling points in dwarf pine stands, alpine grasslands, and ecotones.

Spatial analyses revealed a strong association between Rumex alpinus occurrence and anthropogenic landscape features, particularly mountain chalets and tourist infrastructure. Comparison with historical records showed a decline of populations along tourist trails, likely reflecting herbicide treatment conducted a decade ago. In contrast, populations persisted and expanded near mountain chalets and within dwarf pine (Pinus mugo) stands, which appear to function as management refugia and sources of recolonisation.

Soil analyses revealed exceptionally high nutrient availability. Nitrate and ammonium concentrations reached 76 and 94 μg 10 cm^{-2} per 56 days, respectively, compared to 5 and 8 μg 10 cm^{-2} per 56 days in adjacent alpine grasslands. Phosphorus availability was more than twice as high in invaded stands (49.5 vs. 21.1 μg 10 cm^{-2} per 56 days), supporting the hypothesis that long-term anthropogenic eutrophication promotes the persistence and spread of R. alpinus above the timberline.

These findings suggest that the long-term persistence of R. alpinus above the timberline is driven by the combined effects of anthropogenic nutrient enrichment and the presence of management refugia within dwarf pine stands. Effective conservation management should focus on reducing nutrient inputs from mountain infrastructure and targeting refugial populations that facilitate recolonisation.

POSTER Natural Resources · WUR - Wageningen University & Research, Nederlands · ID 372

Evaluating Biorefinery Pathways for Seaweed Residue from Carrageenan Production: A Technoeconomic and Environmental Perspective

Wildan Hakim
Wageningen University

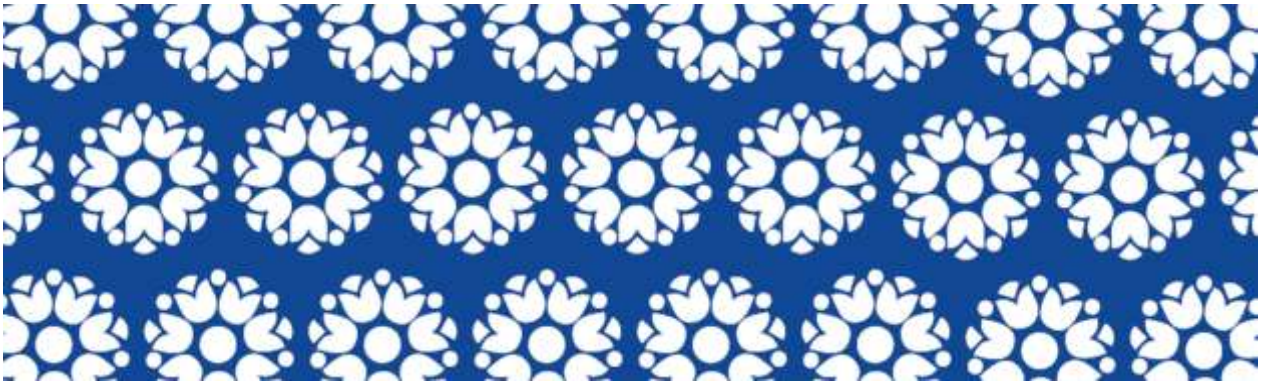
The increasing generation of seaweed residues from carrageenan production presents both an environmental burden and an opportunity for resource valorization, particularly in Indonesia. Despite the growing interest in residue-based biorefinery, there is limited consensus on the most suitable valorization pathways, primarily due to the lack of integrated technoeconomic and environmental assessments. This study aims to evaluate alternative pathways for carrageenan residues and identify the most promising pathway based on economic and sustainability criteria.

A superstructure-based framework was developed and translated into detailed process flowsheets using SuperPro Designer. Each pathway—including cellulose, ethanol, polyhydroxyalkanoates, levulinic acid, antioxidants, and biogas was modelled separately under continuous operation, applying literature-derived operating conditions.

Environmental impact was assessed using an attributional life cycle assessment, with a gate-to-gate system boundary from a waste management perspective, excluding upstream carrageenan production. The functional unit was set at 4,000 tonnes of dry residue, consistent with the technoeconomic model. Inventory data from SuperPro Designer were modelled in SimaPro 9.6 with Ecoinvent 3 database, applying system expansion through product substitution to account for avoided conventional production. Environmental impacts were quantified using the ReCiPe 2016 Endpoint (H) method.

The results indicate that all valorization pathways outperform the baseline waste management scenario economically. Cellulose production is the most economically attractive option, achieving a net present value of USD 6.4 million and a payback period of 8.2 years. In contrast, ethanol exhibits the lowest economic viability and the highest environmental impact despite its extensive study in the literature. Levulinic acid demonstrates a balanced performance, highlighting its potential contribution to Indonesia's energy resilience as precursor for biodiesel production. Key performance drivers include product market value, the use of fermentation or chemical extraction, purification requirements, and energy consumption.

Overall, this study provides an decision-support framework for biorefinery development in Indonesia, highlighting trade-offs between economic feasibility and environmental impact.



TRACK

Soil and water

Living cELLS of soil and water - worlds to explore

19 abstracts · 9 oral presentations · 10 posters

ORAL Soil and water · SLU - Swedish University of Agricultural Sciences · ID 350

Soil microbial responses to manure-digestate-derived biochar assessed by calorespirometry and glucose oxidation

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Keywords:

Biochar; manure digestate; soil microorganisms; calorespirometry; carbon use efficiency

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Abstract:

Biochar made from organic residues is receiving increasing attention as a possible soil amendment for improving carbon storage, nutrient cycling, and soil quality. However, its effects on soil microorganisms are still not fully understood. This is especially important for biochar produced from nutrient-rich materials such as manure digestate, because microorganisms are directly involved in decomposition, nutrient transformation, and carbon dioxide release from soil.

This study explores how soil microorganisms respond to biochar derived from manure digestate. The biochar treatment is compared with a soil control treatment. Glucose, including ^{13}C-labelled glucose in selected incubations, was used as a standard carbon source to stimulate microbial activity and to support interpretation of glucose-derived carbon transformation. Microbial activity is being evaluated by combining heat production measured with calorimeters and CO_2 evolution measured using a Picarro gas analyser. These measurements allow the calorespirometric ratio to be calculated and used as an indicator of microbial metabolic response and carbon recovery in relation to ideal glucose oxidation. Dissolved organic carbon data from fumigated and non-fumigated samples will also be used to help interpret microbial biomass carbon and possible changes in carbon use efficiency and energy use efficiency.

As this thesis work is still ongoing, the final results are currently being analysed. The study is expected to show whether manure-digestate-derived biochar changes microbial metabolic activity, carbon recovery, and energy allocation compared with soil without biochar. Overall, the work may contribute to a better understanding of how digestate-derived biochar affects soil biological processes and its potential role in circular carbon and nutrient management.

ORAL Soil and water · WUR - Wageningen University & Research, Nederlands · ID 376

Living on shifting sands

Luka Biemond
Wageningen University and Research

Coastal dune ecosystems are characterised by dynamic sediment processes that create a mosaic of physiotopes: spatially distinct habitat units with different environmental conditions. These physiotopes act as environmental filters, favouring species with traits suited to local conditions and forming specialised communities. As anthropogenic pressures, including coastal squeeze and sand nourishments, may alter physiotope characteristics and associated communities, it is essential to understand this environmental filtering to maintain the ecological integrity of coastal dunes.

This study examines how different dune physiotopes shape communities of ground-dwelling invertebrates, such as beetles, spiders and beach hoppers, on the Dutch island of Terschelling. Because these organisms respond quickly to environmental change and have limited dispersal, they are well suited to detect local variations. Rather than focusing only on which species are present, the study investigates their functional traits—characteristics determining how species respond to their environment. We hypothesise that differences in the type and intensity of stressors among physiotopes favour different functional traits, leading to distinct invertebrate communities. For example, the bare sand physiotope is characterised by high disturbance, desiccation and low resource availability, favouring small-bodied, surface-active species. In contrast, the more stable foredune physiotope experiences lower abiotic stress but greater biotic stress through competition, favouring larger-bodied burrowing species and more specialised feeding strategies.

Ground-dwelling invertebrates, vegetation, and environmental conditions were sampled across five physiotopes (bare sand, low patch-density embryonic dunes, high patch-density embryonic dunes, wet strips, and foredunes) at five locations using pitfall traps and field measurements. Multivariate trait–environment analyses will examine relationships between environmental conditions, invertebrate communities, and functional traits, providing insight into how environmental filtering structures dune invertebrate communities. The findings will provide a foundation for understanding how coastal management interventions, such as sand nourishments, may influence dune biodiversity and ecosystem functioning.

ORAL Soil and water · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 93

Modelling soil organic carbon using vegetation indices, climate and terrain predictors in Google Earth Engine supporting SDG 15.3 under Mediterranean Ecological Condition

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Soil organic matter (SOM) is a key indicator of soil quality and plays a vital role in enhancing plant growth and productivity. The diverse benefits of SOM in improving soil health highlight the importance of understanding its spatial distribution and accurately estimating its content. In this study, we evaluated the predictive performance of three machine learning (ML) models — Random Forest (RF), Artificial Neural Network (ANN), and Support Vector Regression (SVR) for SOM prediction by incorporating key soil, climatic, terrain, and vegetation index variables. A total of 50 soil samples were collected from the Kemalpaşa sub-basin and analysed for physical, chemical, and biological properties. Predictor variables that showed a significant correlation ($P < 0.05$) with SOM, including total nitrogen, clay content, electrical conductivity, field capacity, calcium, and precipitation, were selected for model training. Among the models tested, ANN demonstrated the best performance, with a coefficient of determination ($R^2 = 0.992$), root mean square error (RMSE = 0.115), and mean absolute error (MAE = 0.069), outperforming both RF and SVR. Furthermore, the analysis indicated that soil physical and chemical properties, particularly nitrogen, available phosphorus, potassium, and electrical conductivity, were more influential in determining SOM variability than environmental predictors. The observed and predicted SOM maps revealed distinct spatial patterns, with the western and northwestern regions of the study area showing the lowest SOM levels. These findings emphasise the need for targeted and sustainable soil management practices in these areas to enhance SOM content. Overall, the results offer valuable insights for informed decision-making in soil management strategies, particularly in the Kemalpaşa sub-basin, with implications for improving both crop productivity and long-term soil health.

ORAL Soil and water · SLU - Swedish University of Agricultural Sciences · ID 219

Effects of water chemistry on diatoms diversity and community structure in boreal headwater streams.

Luca Venturini

Small boreal headwater streams in Sweden are largely excluded from routine monitoring under the Water Framework Directive (WFD). This study investigated how water chemistry affects diatom diversity and community composition in boreal headwater streams across two regions in Sweden (Västerbotten and Halland), in harvested, mature, and nature reserve forest sites. Diatom communities were sampled from three substrates: stone, sediment, and wood and identified using DNA metabarcoding of the rbcL gene. Water chemistry variables were measured including pH, non-purgeable organic carbon (NPOC), nitrate (NO_3), ammonium (NH_4), and phosphate (PO_4). Diversity was assessed using the Simpson index, genus richness, and community assemblages. Statistical analyses included Spearman correlations, linear regression, Kruskal-Wallis tests, NMDS ordinations, PERMANOVA, EnvFit, and Indicator Species Analysis (ISA).

The analysis identified pH and NPOC as the strongest predictors of diatom diversity, pH positively and NPOC negatively predicted diatom diversity. A multiple regression model including pH, NH_4, and PO_4 explained 16.8% of the variation in Simpson diversity. The substrate type significantly influenced both diversity and community composition, with sediment supporting the highest diversity and stone the lowest. pH was the dominant driver on stone substrates, while nutrients such as NPOC and NH_4 were more relevant on sediment and wood. ISA identified Eunotia and Frustulia as indicators of acidic conditions, Gomphonema, Tabellaria, and Fragilaria as indicators of low NPOC and high pH, and Achnanthidium as an indicator of low NH_4. These findings demonstrate that diatom communities are primarily structured by pH and nutrients, with substrate type mediating the strength of these responses. Sediment and wood substrates could include nutrient-driven community. This suggests that future biomonitoring programmes should consider including other substrates together with the conventionally sampled stone. Overall, these results support the potential of DNA metabarcoding for diatom-based biomonitoring in small forest streams that are currently excluded from regulatory and monitoring frameworks.

ORAL Soil and water · BOKU University, Austria · ID 153

Closing the loop with sewage sludge biochar: effects of feedstock and pyrolysis temperature on metal sorption and phosphate release.

Daniël Mugasira Peters
BOKU

Municipal wastewater treatment has substantially improved water quality, yet it generates approximately 9.2 million tonnes of sewage sludge annually within the European Union. Converting sewage sludge into biochar through pyrolysis offers a promising resource recovery strategy by stabilizing carbon and producing a porous, mineral-rich material capable of removing dissolved metals while retaining valuable phosphorus. However, the release behavior of phosphorus from sludge-derived biochars remains insufficiently understood. Rapid phosphorus release may lead to nutrient losses during filtration, whereas slower release could support the beneficial reuse of spent biochars as fertilizers.

This study investigates how sewage sludge feedstock characteristics and pyrolysis temperature influence phosphate release behavior while preserving the biochars' capacity to remove heavy metals, specifically copper, zinc, and lead. Sludges obtained from wastewater treatment plants in Baden and Vienna were pyrolyzed at 400 °C and 700 °C, producing four distinct biochars. Their performance was evaluated using standardized column infiltration experiments conducted according to OENORM B 20560-3. The experiments assessed both heavy metal sorption and phosphorus release under controlled conditions.

It was hypothesized that mineral-rich feedstocks and higher pyrolysis temperatures promote the formation of less soluble phosphorus phases, thereby reducing rapid phosphate release while maintaining or enhancing metal removal performance. By comparing biochars produced from different feedstocks and thermal conditions, this research aims to identify key factors governing nutrient mobility and contaminant retention.

The findings are expected to contribute to the development of design criteria for biochar-based filtration systems that minimize unintended phosphorus losses while preserving heavy metal removal. Furthermore, the study supports circular economy approaches by exploring the potential reuse of spent biochars as slow-release phosphorus fertilizers, thereby linking wastewater treatment, pollution control, and nutrient recovery.

ORAL Soil and water · SLU - Swedish University of Agricultural Sciences · ID 397

Targeted oxidation of pharmaceutical micropollutants in source-separated urine using laccase

Melchior Dräger

Pharmaceuticals are increasingly detected in aquatic environments, with human excretion via urine representing a significant pathway of release. Source separation of urine offers a targeted approach to intercept pharmaceuticals at the point of highest concentration, while simultaneously enabling nutrient recovery as fertiliser. However, public concern about pharmaceutical residues in urine-derived fertilisers represents a potential barrier to wider acceptance of agricultural reuse, and suitable treatment methods compatible with nutrient preservation remain limited.

Laccase, a fungal enzyme, has shown potential to degrade a broad range of pharmaceuticals using only oxygen as a co-substrate, making it an attractive candidate for urine treatment. Yet nostudy has previously tested laccase in real source-separated urine. Urine is acidified to below pH 3 to prevent microbial degradation of urea and loss of nitrogen prior to fertiliser use, which could conflict with the pH range required for laccase activity. Additional challenges include high concentrations of enzyme inhibitors and a complex organic matrix that competes for enzymatic activity.

This study investigated whether laccase from Trametes versicolor could degrade selected pharmaceuticals in real pooled human urine. A series of preparatory experiments assessed laccase activity in urine and established suitable treatment conditions. Urine spiked with a mixture of 19 pharmaceuticals was then treated with laccase over 24 hours, with and without the natural mediators syringaldehyde and vanillin.

Partial degradation was observed for several compounds, while others showed no clear laccase effect, consistent with known structural resistance to laccase oxidation. Mediators provided no consistent enhancement, likely reflecting substrate competition within the complex urine matrix. These results establish proof of concept that laccase can degrade selected pharmaceuticals in real urine, while highlighting the substantial challenges posed by the matrix for enzymatic treatment. The findings provide a basis for future research into optimised enzyme systems and treatment integration within urine-based fertiliser production.

ORAL Soil and water · SGGW - Warsaw University of Life Sciences, Poland · ID 387

Acute Toxicity Assessment of a Quercus robur Knopper Gall Extract Zebrafish Fish Embryos

Bogumił Łosiewicz[1], Vlatka Gvozdić[2], Lidija Kalinić[2], Maciej Kamaszewski[3], Kacper Kawalski[4], Selma Mlinarić[2], Rafał Wild[4]

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Natural plant-derived extracts are increasingly investigated for pharmaceutical, cosmetic, and agricultural applications, making their environmental safety assessment essential. This study evaluated the acute toxicity of an extract obtained from Knopper galls of *Quercus robur* (QRE) using the zebrafish (*Danio rerio*) Fish Embryo Toxicity (FET) test based on the principles of OECD Test Guideline 236.

Zebrafish embryos were exposed for 96 hours post-fertilization to nominal QRE concentrations of 20, 40, 60, 80, and 100 µg/L. Water and DMSO solvent controls were included. Mortality, hatching, and morphological abnormalities were recorded at 24, 48, 72, and 96 hpf. Statistical analyses included Fisher's exact tests, the Cochran–Armitage trend test, and probit concentration–response modelling to estimate the 96-h LC_{50}.

Cumulative mortality remained low across all exposure groups (3.33–6.67%) and did not differ significantly from the DMSO control (all $p \geq 0.36$). No concentration-dependent increase in mortality was detected (Cochran–Armitage test, $p = 1.00$), and the probit model showed no significant concentration–response relationship ($p = 0.93$). Consequently, the 96-h LC_{50} could not be estimated within the tested concentration range and was concluded to exceed 100 µg/L. No treatment-related morphological abnormalities were observed. Although lower hatching rates were descriptively noted in treated groups, inconsistencies in the control hatching records prevented reliable statistical interpretation.

The *Quercus robur* Knopper gall extract exhibited low acute toxicity toward zebrafish embryos at concentrations up to 100 µg/L, with no evidence of concentration-dependent lethality or teratogenic effects. These findings support the environmental safety of the extract within the tested exposure range, while further studies at higher concentrations and with additional developmental endpoints are recommended to establish a definitive toxicity threshold.

ORAL Soil and water · HUJI - Hebrew University of Jerusalem · ID 272

Associations between soil taxonomy and the distribution of ground-nesting bees in Israel

Tuti Ninio
The Robert H Smith Faculty of Agriculture, Food and

Soil Preference Characteristics of Ground Nesting Bees

Ground-nesting bees comprise the majority of bee species worldwide, with more than 70% of species nesting in soil. This group plays a central role in pollination networks in both natural and agricultural ecosystems; however, the ecological requirements of their nesting sites remain insufficiently understood, particularly in biodiversity-rich Mediterranean regions such as Israel (Michener, 2007; Cane & Neff, 2011). Soil properties such as texture, compaction, drainage, and moisture may affect excavation ability, nest-burrow stability, and the successful underground development of offspring (Cane, 1991; Harmon-Threatt, 2020).

This study examines the relationship between soil types and the activity and distribution of ground-nesting bees in Israel by combining a controlled field experiment with GIS-based spatial analysis. In the first phase, an experimental system was established in a watermelon field, consisting of artificial nesting mounds and cavities constructed from three soil types differing in texture, with four replicates. Wild flowering plants were planted around the structures to attract pollinators, and weekly monitoring was conducted to record floral abundance and diversity, pollinator visitation, and nest presence. Although high and diverse pollinator activity was observed, no active nesting was recorded within the experimental structures, highlighting the challenges of creating artificial nesting conditions under field settings.

In the second phase, a GIS analysis is being conducted by cross-referencing bee occurrence records from the Tel Aviv Museum and laboratory datasets with Israel's national soil taxonomy map. The analysis compares presence-absence and presence-only datasets while examining potential associations between major bee families and soil categories at regional and national scales. This approach is expected to help identify soil-related distribution patterns and improve understanding of the role of soil in shaping suitable habitats for ground bees in israel.

ORAL Soil and water · SLU - Swedish University of Agricultural Sciences · ID 205

Linking fungal dynamics and functional genes to environmental factors

Rebecca Poms

Decomposition is a key ecosystem function and one of the fundamental processes in freshwater ecosystems, driving nutrient cycling and energy flow within aquatic food webs. However, decomposition processes can be strongly influenced by nutrient enrichment coming from agriculture. Aquatic hyphomycetes (subgroup of aquatic fungi) are among the most important organisms driving decomposition in streams, making their response to environmental change a pivotal factor in overall ecosystem health. This study investigates whether fungal decomposition-related genes can help us understand how environmental conditions affect decomposition processes. A laboratory decomposition experiment was conducted using three species and a mixed species community grown in a mineral solution with three different N:P ratios and a carbon source of cellulose substrate for decomposition. Decomposition was assessed as cellulose mass loss, DNA abundance was quantified and qPCR was performed with primers for cellobiohydrolase (CBHI, a functional gene) to determine gene copy number. For all groups an increase in P (lower N:P ratio) resulted in an increase in mass loss (decomposition). DNA abundance was significantly positively correlated with decomposition for all the groups and increased P-levels generally resulted in higher DNA concentrations for most groups. In contrast, qPCR analysis revealed CBHI copy numbers did not differ significantly between nutrient treatments and showed no significant relationship with decomposition. The positive association between DNA abundance and decomposition within species groups indicates that molecular measurements have potential to be used as proxies for fungal activity. However, the absence of a predictable correlation between CBHI copy numbers and decomposition indicates that CBHI abundance alone cannot yet predict ecosystem functioning. Further research is needed to evaluate the applicability of aquatic fungal functional gene-based approaches for monitoring decomposition processes in freshwater ecosystems.

POSTER Soil and water · SLU - Swedish University of Agricultural Sciences · ID 270

Benthic Food Web Dynamics in Arctic/Alpine Lakes and Streams - Analyzing Nutrients, Stable Isotopes and Fatty Acids

Dennis Lausch

Arctic and alpine freshwater ecosystems are highly sensitive to climate change, where ongoing warming and landscape greening promote oligotrophication and reduce dissolved inorganic nitrogen to total phosphorus (DIN:TP) ratios. This thesis investigates how shifting nutrient stoichiometry affects essential omega-3 highly unsaturated fatty acids (EPA+DHA) in epilithic biofilms, as well as the trophic structure of associated meiofauna. Research was conducted across 11 subarctic lakes and 9 streams along a 600 km latitudinal gradient in the Swedish Scandes, combining stable isotope (delta13C, delta15N) and fatty acid analyses.

In streams, higher DIN:TP ratios correlated negatively with EPA+DHA concentrations, indicating that phosphorus limitation constrains essential fatty acid synthesis. This relationship was absent in lakes, likely due to hydrodynamic decoupling of the benthic boundary layer. Because algal taxonomic composition did not significantly predict fatty acid quality, physiological stress responses likely override community composition as drivers of biochemical quality. Furthermore, isotope data revealed a heterogeneous meiofauna community where Chironomidae acted as primary grazers (mean trophic position = 1.38), while Oligochaeta (2.35) and Harpacticoida (2.44) occupied higher, more diverse positions. Strong isotopic coupling confirmed tight consumer-resource linkages, with meiofauna contributing up to 83.9% of biofilm carbon and 24.3% of nitrogen. Finally, stream Chironomidae exhibited more depleted delta13C values than lake individuals, reflecting flow-dependent carbon fractionation and a greater reliance on atmospherically influenced carbon in lotic systems.

POSTER Soil and water · SLU - Swedish University of Agricultural Sciences · ID 90

Application of Life Cycle Assessment (LCA) to Compare the Environmental Impacts of Structural Soils based on Biochar versus Pumice

Aino Agné
SLU - Swedish agricultural university

The following bachelor's thesis explores the environmental impact of two kinds of structural soils, one pumice-based and one biochar-based, using the methodology of life cycle assessment (LCA). The key question is which of the structural soils carry the least environmental impact, but secondary questions model various alternate scenarios, and then assess whether the initial result stands true. The field of LCA is rapidly growing, but naturally not equally so in all aspects of life and consumption. Poignant is the lack of LCA within landscape architecture, and in particular the design aspects. Thus, the aim of this thesis was to provide a comparative investigation of two commonly used products in the planning of urban green infrastructure in Sweden, in order to aid a landscape architect in making the most sustainable choice. The research was conducted entirely based on the principles of LCA, with the goal and scope definition, life cycle inventory, life cycle impact assessment and finally the interpretation of results. The key finding was that the pumice based structural soil had the highest environmental impact, but nuances regarding maintenance, such as irrigation, complicated the picture greatly, and thus the biochar-based structural soil had the highest impact in some alternative scenarios.

POSTER Soil and water · SLU - Swedish University of Agricultural Sciences · ID 132

Fate of mercury in the Degerö Stormyr peatland, Northern Sweden

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Mercury (Hg) is a neurotoxic heavy metal that can be taken up by vegetation from the atmosphere. Peatlands, formed by decomposed vegetation, store significant amounts of Hg, part of which is transported to downstream aquatic ecosystems. Peatlands also serve as a natural archive of atmospheric Hg concentrations in a chronological order, even though post-deposition processes can mobilize Hg from the peat. Understanding the fate of mercury in peatlands is important for predicting how ecosystems respond to changing atmospheric Hg concentrations. In this study, Hg concentrations in eight peat cores collected in 2025 from Degerö Stormyr, Sweden, were analyzed and compared with those in peat cores sampled in 2015 and 2020. We found that the Hg pool decreased over the last decade, and that different peat cores can exhibit very distinct biogeochemical properties even if sampled from the same site, separated by only a few meters. The vegetation growing on the peatland also showed variable Hg concentrations depending on species and the parts of plants analyzed. Our findings of large intra-variability in Hg levels highlight the importance of investigating multiple sites and cores to monitor Hg concentrations within the same peatland and of analyzing several cores from the same sites. It is also significant to include an analysis of plants, both surface vegetation and of plant macrofossils in the peat. They are to ensure a comprehensive investigation of Hg mobility in peatlands and a robust evaluation of temporal changes in atmospheric Hg levels using peat records.

POSTER Soil and water · NMBU - Norwegian University of Life Sciences · ID 97

Saline Exposure Leave Legacies that Modify Future Soil Biogeochemical Responses to Salinization in a Texture Dependent Manner

ragne kyllingstad, Åsgeir Almås, Peter Dörsch
NMBU

Soil salinization is accelerating worldwide due to climate change, seawater intrusion, and crop-irrigation, threatening the microbial processes that regulate carbon (C) storage and nitrogen (N) cycling. While soil microbial adaptation to long-term salinity has been documented, little is known about how past exposure to salt affects future biogeochemical responses.

We investigated salinity legacy effects on soil biogeochemical functioning in sandy and clayey agricultural soils previously irrigated with water of 0, 3, or 6 dS m^{-1} in a UK spinach pot experiment. After three years of storage, soils were resuscitated with plant litter, exposed to an acute saline shock (9 dS m^{-1}) or freshwater control, and subsequently flushed with freshwater. We quantified microbial carbon use efficiency (mCUE), respiration, denitrification, and nitrification potentials including differentiation of ammonia-oxidizing archaea (AOA) and bacteria (AOB).

Legacy salinity altered responses to renewed salinization in a strongly texture-dependent manner. In sandy soil, previous saline exposure stabilized microbial carbon use efficiency responses to saline re-exposure, shifted nitrification towards AOA dominance, and promoted more complete denitrification. In contrast, clay soil exhibited reduced microbial carbon use efficiency and less complete denitrification following renewed salinization, while nitrification remained dominated by both AOB and AOA.

Previous saline irrigation induced persistent, soil-specific changes in microbial carbon and nitrogen cycling that altered responses to renewed salinization. In sandy soils, these changes were associated with more efficient retention of carbon and nitrogen in the soil system, suggesting that controlled saline irrigation may enhance microbial tolerance to future salinity stress.

Acknowledgements: Professor Peter Dörsch, Professor Åsgeir Almås, SoilSalAdapt, EJP SOIL & RCN

POSTER Soil and water · HUJI - Hebrew University of Jerusalem · ID 41

Linking microbial spatial organization and water dynamics in soils

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Soils are living and dynamic environments that support plant growth, regulate water availability, and contribute to major biogeochemical cycles. Within soils, microorganisms play a central role in many biological processes, yet their influence on the physical behaviour of soil remains poorly understood. One important example is soil drying. Since soil water content affects important processes such as microbial activity, plant productivity, and gas exchange between soil and the atmosphere, understanding how microorganisms influence water retention is important for both natural and agricultural systems. In this study, we investigate how bacterial spatial organization within soil-like pore networks is shaped by carbon availability, water distribution, and pore geometry, and how this organization may feed back on drying dynamics. To study these processes directly, we use transparent microfluidic systems that mimic the fine structure of soil while allowing real-time microscopic observation of both bacteria and water. The experiments focus on Pseudomonas putida and selected mutants that differ in traits such as motility, surface attachment, and biofilm formation. This approach allows us to link bacterial functional traits with patterns of pore-scale colonization and water retention during drying. The system is exposed to low and high glucose concentrations, representing different levels of carbon availability, and is then allowed to dry while changes in water saturation and bacterial distribution are monitored over time. Preliminary observations suggest that high carbon availability supports greater bacterial biomass and biofilm formation, with bacteria occupying a wider range of pore spaces. These patterns are accompanied by a tendency for systems with greater microbial biomass to retain water for longer periods during drying. Overall, this study links microbial ecology with porous media physics and provides insight into how bacterial spatial organization can modify soil drying behaviour at the pore scale.

POSTER Soil and water · CZU - Czech University of Life Sciences Prague, Czech Republic · ID 239

Evaluation of Photovoltaic Park Response to Extreme Drought Compared to Intensively Managed Arable Land Using Remote Sensing Data

Marie Neterdová
Česká zemědělská univerzita v Praze

This thesis evaluates the response of photovoltaic (PV) parks to extreme drought in comparison with intensively managed arable land under Czech conditions, with the aim of assessing whether these two land use types differ in vegetation stress and surface thermal response.

The analysis employs a paired site design (PV park × control arable plot) with soil condition control using the BPEJ soil quality layer. Remote sensing data from Sentinel-2 and Landsat are used to derive three complementary indices: NDVI (vegetation greenness), NDMI (vegetation water content), and LST (land surface temperature). The study covers contrasting climatic periods including the extreme drought of 2018, a contrasting wet reference year, and the dry spring of 2026, enabling assessment of both stress response and post-drought regeneration dynamics. A before-after design is incorporated using Landsat imagery predating PV installation, allowing comparison of land surface properties prior to and following conversion from arable land to photovoltaic use.

Differences between land use types will be statistically evaluated using a paired approach across multiple PV sites in the Czech Republic.

The results will contribute to the discussion on the environmental functions of photovoltaic parks in agricultural landscapes and their potential role in landscape adaptation to climate extremes.

POSTER Soil and water · EMU - Estonian University of Life Sciences · ID 80

Challenges and Opportunities of Localized Riverside Incubation for Conservation-Oriented Fish Reproduction

Heli Annok
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Conservation-oriented fish reproduction programmes are often based on centralized hatcheries that require substantial infrastructure, water treatment systems and the transport of biological material between locations. Localized riverside incubation may provide an alternative approach by allowing fish eggs to be incubated closer to their natural habitat while reducing infrastructure requirements and supporting watershed-based conservation efforts.

This study examined the opportunities and limitations of a mobile riverside incubation system developed and tested during pilot trials conducted between 2024 and 2026. River lamprey (Lampetra fluviatilis) was used as a model species because of its ecological importance and the sensitivity of its eggs and larvae to environmental conditions during early development. The incubation station used natural river water and operated under semi-natural conditions directly alongside the river.

The system was gradually improved over three consecutive spawning seasons. Modifications were made to water intake, filtration, circulation and monitoring components based on observations from previous trials. Environmental factors monitored during incubation included water temperature, dissolved oxygen, water flow, suspended organic matter and fungal development.

The pilot trials demonstrated that egg development was possible within the riverside incubation system when sufficient water circulation and oxygen availability were maintained. Several practical challenges were identified, including the accumulation of organic matter, environmental variability and the need for regular maintenance and monitoring. These observations highlighted the importance of careful system design when operating under field conditions.

Localized riverside incubation may offer several ecological and practical advantages for conservation-oriented reproduction programmes. Incubating eggs within the same watershed as the broodstock may reduce the need to transport biological material and help preserve local genetic characteristics, and support watershed-specific genetic diversity. The results of this three-year pilot study provide a foundation for the further development of low-impact and sustainable fish reproduction technologies and their potential application in conservation and restocking programmes.

POSTER Soil and water · WUR - Wageningen University & Research, Nederlands · ID 217

Photogrammetric 3D Reconstruction of Coral Surface Area and Growth: Methods and Challenges

Fazilatun Nesa

Coral surface area and growth are key indicators for addessing reef health and evaluating restoration strategies. Traditional methods for measuring coral surface area, such as wax dipping are often destructive and unsuitable for repeated measurments. Recent advancement in photogrammetry provides non-invasive alternatives, but their accuracy and applicability for small coral fragments remain insufficiently evaluated. This study compared three approaches for estimating coral surface area; the traditional wax diiping method, a commercial phtogrammetry system (BABETTE Pro) and a low-cost custom built 3D reconstruction workflow.Thirty fragments of the branching coral *Stylophora pistillata* were used for surface area validation, while five additional fragments were monitored over a month to assess growth using repeated 3D reconstructions. Methods performance was first vaidated using geometric refernce objects with known surface areas. All three methods BABETTE Pro, wax dipping and the custom-built photogrammetry workflow showed strong correlations with geomentric refernce measurements (R2=0.98, R2=0.97, and R2=0.99 respectively). However,comparision of coral fragments revealed significant differences between wax dipping and BABETTE Pro measurments, with wax-derived estimates averaging 39.6% higher. The low-cost workflow underestimated coral surface area by average of 12.3% relative to BABETTE Pro. Despite this bias, 3D model comparisions successfully detected coral growth over one month, showing surface area with a mean increase of 29.8% and a mean outward linear extension of 0.81mm. These findings demostrate that photogrammetry provides a practical and non-destructive approach for monitoring coral growth. While BABETTE Pro offers the highest measurment accuracy, low-cost photogrammetry represents an accessible alternative for comparative growth studies and resource limited reef monitoring research.

POSTER Soil and water · UNITUS - University of Tuscia, Italy · ID 276

An atlas of gene expression and alternative splicing across stress conditions in microalgal species: a focus on CO2 capture.

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Microalgae are among the most efficient biological systems for capturing atmospheric carbon dioxide (CO_2) and therefore represent promising resources for sustainable biotechnological applications aimed at climate change mitigation. Their ability to maintain photosynthetic activity under changing environmental conditions relies on complex molecular responses that are still not fully understood, particularly across evolutionarily distant groups.

This study investigated the molecular mechanisms associated with CO_2 capture and environmental adaptation in representative species of Chlorophyta and Ochrophyta through a comparative transcriptomic approach. Publicly available RNA sequencing datasets comprising 163 experiments from six independent BioProjects were reanalyzed using a standardized workflow. Gene expression patterns, alternative splicing events, and gene co-expression networks were integrated to identify both conserved and lineage-specific regulatory responses.

The analyses revealed extensive transcriptional reprogramming in response to elevated CO_2 levels, light fluctuations, and diel conditions. Thousands of genes showed significant expression changes, with strong species-dependent responses across the examined microalgae. Conserved responses included the activation of genes involved in photosynthesis, carbon-concentrating mechanisms, and carbon metabolism, highlighting common strategies that support efficient carbon fixation. At the same time, distinct regulatory patterns emerged between Chlorophyta and Ochrophyta, suggesting different evolutionary solutions to environmental adaptation. Alternative splicing analyses identified condition-dependent transcript variants affecting key photosynthetic and metabolic functions, indicating that post-transcriptional regulation contributes to stress acclimation. Gene co-expression network reconstruction further identified groups of tightly coordinated genes and several candidate hub genes potentially involved in enhancing photosynthetic performance and resilience.

Overall, the results demonstrate that efficient CO_2 capture in microalgae is supported by a multilayered regulatory framework involving coordinated gene expression, alternative splicing, and network-level interactions. These findings provide new insights into microalgal adaptation and identify potential molecular targets for future strategies aimed at improving sustainable carbon sequestration technologies.

POSTER Soil and water · SLU - Swedish University of Agricultural Sciences · ID 113

River or dendrotelmata: Does habitat of origin shape the tolerance of aquatic hyphomycetes to lead and copper?

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Aquatic hyphomycetes (AHs) are pivotal decomposers of submerged organic matter in freshwater ecosystems. However, their ability to perform this crucial ecosystem process can be sensitive to anthropogenic pollution of their habitats. Among AHs habitats, water filled tree holes (dendrotelmata, WTHs) are micro-habitats that occur worldwide and host very different organism groups. Due to their position near the bottom of trees, WTHs act as pollutant traps, including for TME (Trace Metal Elements). However, our understanding of the capacity of AHs to cope with metals remains poorly understood and WTHs could be a useful study system for this little-known environmental issue. We explored the tolerance of *Alatospora acuminata, Tricladium terrestre and Tricladium sp.* strains to a gradient of copper and lead, alone and in combination. The strains were isolated from both WTHs and from the river of Massane reserve (Southern France) which likely contains much lower TME concentrations. Under control conditions (no metal), river strains had higher growth rate than WTHs strains. All species exhibited a markedly higher lead than copper tolerance (measured by higher EC50). Under copper addition, we observed a significantly higher EC50 for *T. terrestre* strain from dendrotelmata than from the river. Also, the mixture of both metals had a stronger effect than expected. Our results demonstrate that copper poses a substantial risk to non-target fungi which challenges its approval in organic farming. They also suggest that copper can potentiate the impact on AHs in environments already impacted by other metals. This highlights the need for intraspecific research, combining mycology, environmental chemistry, and functional ecology in this case. This project was funded by the MULTIBEF project and thanks to DendroMetals&Co project (and Toulouse University grants). Big thanks to Elisa Pianta for DNA extractions and PCRs, and to Red Calore for insights on morphological identifications.

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