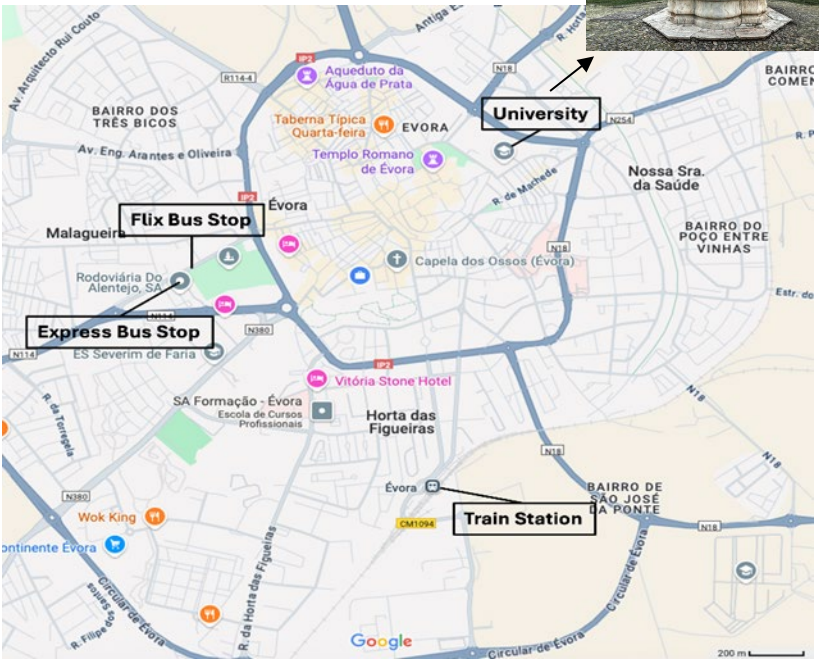
Evora, 25-27 June 2025

Evora information

Colégio do Espírito Santo



Map of Evora city

The meeting will take place in the "COLÉGIO DO ESPÍRITO SANTO AMPHITHEATRE" (room 131)

Arrows at the entrance will direct you to the place

All infos are on our dedicated webpage:
https://e-niche.eu/news/e-niche-annual-meeting-in-evora/

Organizers

Local
Main organizer:
Eduardo Nuno **Barata (Univ of Evora)**

Meeting's Assistants:

Carolina Maria	**Popa**
Mariana Rosado	**Barão**

Core Group:

Conxita	**Avila**
Anne-Geneviève	**Bagnères-Urbany**
Thomas	**Blankers**
Sylvie	**Baudino**
Aurelie	**Cartereau**
Levent	**Cavas**
Stefano	**Colazza**
David	**Giron**
Júlia Katalin	**Jósvai**
Julie	**Maguire**
Maria	**Pappas**
Soizic	**Prado**
Christelle	**Robert (Absent)**
Giovanna	**Romano**
Pavel	**Stopka**
François	**Verheggen**

Find the list of participants page 65-66

Overview of the program

Wednesday 25th of June
9:00-10:30 MC meeting
10:30-11:00 coffee break
11:00-12:30 continued MC meeting
12:30-13:30 lunch break for MC+CG
13:30-14:00 welcome to all participants
14:00 -15:00 presentation from the CG to all participants
15:00-16:30 SME's session
16:30-19:00 long coffee/drink break: poster session
19:00 - Evening free

Thursday 26th of June
9:00-10:30 YRI's session
10:30-11:00 coffee break
11:00-12:30 round table of the YRI's session on smaller committee
11:00-12:30 parallel session with discussion with WG leaders on papers and on other activities.
12:30-14 lunch break
14:00-16:00 WG2 workshop on "Communication systems in invasive species"
16:00-16:30 coffee break
16:30-18:00 talks
18:00-19:00 WG discussion on papers (in parallel sessions)
19:30 banquet on site (voluntary joint dinner with previous registration (closed) and individual payment to Evora University)

Friday 27th morning
9:00-10:30 talks
10:30-11:00 coffee break
11:00-12:15 talks
12:30-14:00 lunch break
14:00-15:15 talks
15:15-16:00 coffee break
16:00-16:30 concluding remarks

MC: Management Committee; CG: Core Group; SMEs: Small and Medium Enterprises; YRIs: Young Researchers and Innovators; WG: Working Group.

Program

Wednesday 25th June

9h00 - 10h30	**Management Committee – Core Group Meeting: with presentation from the CG (WG leaders, representatives, GH manager) (40 people)**
10h30 - 11h00	**Coffee Break**
11h00 - 12h30	**Management Committee – Core Group Meeting (continued)**
12h30 - 13h30	**Lunch break (only MC & CG – 40p)**
13h30 - 14h00	**Welcome to participants – Badge distribution**
14h00 - 15h00	**Core Group presentation**
15h00 - 16h30	**Small and Medium Enterprises' session:** **See program page 9 (6 talks)** **Abstracts from page 11**
16h30 - 19h00	**Coffee and Drinks - Poster session** **Posters numbering page 49-50** **See Posters abstracts page 51**
19h00 - …	**Free Evening**

Program

Thursday 26th June

9h00 - 10h30	**Young and Innovators Researchers' session** **See program page 14 -16** **Abstracts page 17** **Group 1 to 3 (12 YRIs)**
10h30 - 11h00	**Coffee break**
11h00 – 11h30	**YRIs' session Group 4 (7 YRIs)**
11h30 – 12h30	**❖ Round table organized by YRIs (small committee)**
11h30 - 12h30	**❖ Parallel session: discussion with WG leaders on publications and activities**
12h30 - 14h00	**Lunch break**
14h00 - 16h00	**WG2 workshop on "Communication systems in invasive species" (7 talks)** **See program page 26&27** **Abstracts page 28**
16h00 - 16h30	**Coffee break**
16h30 - 18h00	**General talks – Nb 1** **See program page 32** **Abstracts page 33**
18h00 – 19:00	**❖ Working groups discussion in two parallel sessions**
19:30 -	**Banquet (for registrants only) 49p**

❖ **Parallel sessions are in the amphitheater and room 124**

Program

Friday 27th June

9h00 - 10h30	**General talks – Nb 2** **See program page 36** **Abstracts page 37**
10h30 - 11h00	**Coffee break**
11h00 – 12h15	**General talks – Nb 3** **See program page 40** **Abstracts page 41**
12h30 - 14h00	**Lunch break**
14h00 - 15h15	**General talks – Nb 4** **See program page 44** **Abstracts page 45**
15h15 - 16h00	**Coffee break**
16h00 - 16h30	**Concluding remarks – "Au revoir"**

ORAL

COMMUNICATIONS

SMALL and MEDIUM ENTREPRISES (SMEs) SESSION

Organizer: Julie MAGUIRE (SME representative)

(https://e-niche.eu/industry/)

(25th afternoon)

ORAL PRESENTATIONS FROM SMEs

15:00 – 15:10 **Helena ABREU**
International Seaweed Association
Algalink, Torreira-Murtosa, Portugal

15:10 – 15:20 **Vahideh RABANI**
AMIROY, France

15:20 – 15:30 **Emma DERMITZAKI**
VIORYL, Greece

15:30 – 15:40 **Ene LEPPIK**
Agriodor, France

15:40 – 15:50 **Teun DEKKER**
BioInnovate, Netherland

15:50 – 16:00 **Julie MAGUIRE**
Bantry Marine Research Station, Ireland

16:00 – 16:30 **QUESTIONS & OPEN DISCUSSION**

ABREU, H.[1,2]*, MAGUIRE, J.* [1]*, McELLIGOT, D.* [1]*, POLLARD, P.* [1]*, VAN ROOSMALEN, R.* [1]
[1]*Bantry Marine Research Station, Gearhies, Ireland*
[2]*Algalink, Torreira-Murtosa, Portugal*

UNLOCKING SEAWEED POTENTIAL: CHEMICAL ECOLOGY FOR SUSTAINABLE FARMING AND HIGH-VALUE APPLICATIONS

The seaweed sector is thriving across Europe, with SMEs playing a central role in scaling up biomass production, processing, and advancing valorization into food, cosmetic, and nutraceutical products. Optimizing farming protocols to meet quality and yield targets requires deeper insights into how seaweeds interact with their environment.

This presentation highlights the relevance of chemical ecology for seaweed cultivation, focusing on the chemically mediated processes that influence growth, reproduction, crop quality, and bioactive compound profiles. Factors directly impacting commercial outcomes for SMEs.

Four case farmed seaweed types currently relevant in the EU—*Ulva*, *Asparagopsis*, *Porphyra*, and kelps (*Saccharina* and *Alaria*)—will be discussed to illustrate how species-specific chemical traits may shape farming strategies and end-use potential. The talk also briefly addresses the implications of certain seaweed metabolites for environmental safety and regulatory considerations.

RABANI V., *CHEATSAZAN H.*
AMIROY, 8 avenue des parcs, 70100, Arc les Gray, France

GREEN CHEMISTRY FROM BENCH TO FIELD

AMIROY is a pioneering company in green chemistry, specializing in the valorization of co-products into high-value bio-inputs for agriculture. At the heart of AMIROY's expertise lies chitosan, a diverse family of biopolymers with broad biological applications. With in-depth knowledge of all chitosan variants, including those derived from insects, AMIROY has developed patented formulations tailored to optimize crop performance. For over five years, these bio-based solutions have demonstrated strong biostimulant effects in the field—enhancing soybean yields and protecting corn against fungal threats like Fusarium. Beyond product development, AMIROY offers its scientific and technical expertise to industry and academic partners, contributing to innovation in sustainable agriculture. The company excels at integrating biopolymers and active molecules to enhance existing agricultural solutions. With a commitment to eco-friendly practices and a results-driven approach, AMIROY is actively participate in shaping the future of bio-based crop inputs and sustainable plant health strategies

DERMITZAKI, Emma
Head of Biotechnology Lab, Vioryl Chemical and Agricultural Industry, Scientific Research S.A
28th km National Road Athens-Lamia, Greece

HARNESSING SEMIOCHEMICALS FOR SUSTAINABLE AGRICULTURE

Certain pests are notoriously difficult to control using chemical methods due to factors such as resistance, behavior, and environmental impact. By adhering to chemical ecology principles, Vioryl S.A focuses on researching semiochemicals, particularly sex pheromones, as alternative and environmentally friendly solutions to effectively tackle pest threats while preserving the parasitoid and predator fauna in the field.
Successful products based on semiochemicals produced in our Organic Synthesis Lab have reached the market, offering effective IPM tools for monitoring pest populations or mass killing agronomic pests. This strategy allows our company to uphold its green principles and provide sustainable solutions that support agricultural productivity.

DARDOURI T., DELPOUX C., BERTRAND P-E, SARLES L., TIXERONT M., GARNIER A., DAUGAN C., HECKY T., DUPUY F., FUIOR A., REBILLARD M., ***LEPPIK E.***
Agriodor, 6 rue Pierre-Joseph Colin 35000 Rennes, FRANCE

CONTROL OF SUGAR BEET YELLOWS VIRUSES BY BEHAVIOURAL MANIPULATION OF APHID VECTORS IN THE FIELD VIA VOLATILES

Aphids (*Myzus persicae*) pose a global threat to crops, especially sugar beet, due to their damage and ability to transmit yellow virus. The search for eco-friendly pest management has intensified after the ban on neonicotinoids, highlighting the need for sustainable alternatives. The use of volatile organic compounds (VOCs) for managing *Myzus persicae* in sugar beet has shown promise, though challenges remain regarding efficacy and sustainability. This research aims to validate the effectiveness of laboratory-selected VOC blends as biocontrol agents in field trials. Field studies were conducted using a randomized block design with four replications. Results indicate that specific VOC blends can regulate the behavior and biology of *Myzus persicae*. These compounds act as repellents to winged aphids at short distances, influencing feeding, reproduction, and development in wingless forms. Application of the VOC blend, mimicking natural plant repellents, reduced aphid populations by up to 70% under field conditions. This strategy offers an eco-friendly and effective option for managing aphids in sugar beet cultivation.

DEKKER, Teun
BioInnovate, Costerweg 1w, 6702AA, Wageningen, The Netherlands

GREENOVATION AND REGULATORY INNOVATION

In spite of an extensive range of chemical ecological innovations that can lower the dependency on insecticides, little of our research efforts see the light of day beyond experimental proof-of-concept. The much sought after real 'green' revolution or greenovation is largely halted in its tracks by regulatory constraints. In fact, the regulations that were put in place to reduce environmental impacts, are today the main hurdle for greenovation, particularly in the EU. This is compounded by market economics, conflict of interests and a general lack of governance. Strategic regulatory innovations are urgently needed to turn the tide and provide the incentive for innovative businesses with chemical ecological innovations to flourish within the EU. During this talk I would like to illustrate the issue using some examples (oak processionary moth, bark beetles, spotted wing drosophila, Tuta and fall army worm), and aim to reflect together on how E-niche can be one of the drivers for regulatory innovation, such that chemical ecological research more readily leads to impacts, beyond the journal's impact factor.

MAGUIRE, Julie
Bantry Marine Research Station, Cork, Ireland

SEAWEED PRODUCTION AT BMRS – THE GOOD, THE BAD AND THE UGLY

Bantry Marine Research Station (BMRS) on-shore production activities encompass lumpfish and wrasse production in Ireland and England, a seaweed nursery and three seaweed marine farms. Currently they produce *Alaria esculenta* and *Saccharina latissima* seeded string and gametophytes as well as mature plants, and *Asparagopsis armata* and *Porphyra umbilicalis* in tank culture. Since its inception in 2005, BMRS has been interested in seaweeds researching their potential for bioremediation to their biotechnological applications. BMRS is now seeking to shift from just primary production and R&D into commercial exploitation of the high-value compounds from marine sources. Although the benefits of growing seaweed are very clear, there still remains a number of bottlenecks before the industry can consider itself successful. Therefore, this presentation will cover all the ups and downs of setting a seaweed company in Europe.

YOUNG RESEARCHERS & INNOVATORS (YRIs) SESSION

Organizer: Julia JOSVAI (YRI representative)

Subgroup organizers:

1 / Aquatic - Freshwater: **Güllü Kaymak**

2/ Aquatic - Marine: **Victoria Moris**

3/ Terrestrial – Plant: **Kaia Kask**

4/ Terrestrial – Animal: **Laura Bellec**

YRI session Program

(26th morning)

9:00 – 9:05 Introduction

9:05-9:15: Future Careers in Chemical Ecology Survey
- **Thomas Blankers**, Christelle Robert, François Verheggen

9:15 – 10:30 YRIs' presentation by subgroup (3 minutes each YRI and 10 min per group presentation) = group 1 to 3

10:30 -11:00 Coffee break

11:00 – 11:30: YRIs' presentation by subgroup (3 minutes each YRI and 10 min group presentation) = group 4

11:30 – 12:30: Round table of YRIs in parallel session (small committee)

Subgroup name	YRI
Aquatic - Freshwater	Güllü Kaymak
Aquatic - Freshwater	Faysal-Al Mamun
Aquatic - Freshwater	Hasmik Khachatryan
Aquatic - Freshwater	Thacilla Ingrid De Menezes
Aquatic - Freshwater	***GROUP 1 presentation***
Aquatic - Marine	Victoria Moris
Aquatic - Marine	Guy Schleyer
Aquatic - Marine	Andrea Prófumo
Aquatic - Marine	Miguel Rodrigues
Aquatic - Marine	Christina C. Roggatz
Aquatic - Marine	Mayara Roncaglia dos Santos
Aquatic - Marine	***GROUP2 presentation***
Terrestrial - Plants	Kaia Kask (no talk)
Terrestrial - Plants	Dorian Rossi
Terrestrial - Plants	Milica Radan
Terrestrial - Plants	***GROUP 3 presentation***
Terrestrial - Animal	Bellec Laura
Terrestrial - Animal	Alberto Maria Cattaneo
Terrestrial - Plants	Eleni Koutsogeorgiou
Terrestrial - Animal	Julia Jósvai
Terrestrial - Animal	Magdolna Szelényi
Terrestrial - Animal	Maryse Vanderplanck
Terrestrial - Animal	Thomas Blankers
Terrestrial - Animal	***GROUP 4 presentation***

Aquatic Freshwater sub-session

KAYMAK, Güllü
Kütahya Health Sciences University, Kütahya, Türkiye

EFFECTS OF QUATERNIUM-15 ON ZEBRAFISH LIVER CELLS AND THE PROTECTIVE ROLE OF VITAMIN E

See Abstract in Poster session

MAMUN, F., *KUMAR, R., BESTER, K., ZEEKER, I*
Institute of Chemistry, University of Tartu, Tartu, Estonia

ENHANCED MICROPOLLUTANT REMOVAL IN MBBR SYSTEMS: UNVEILING PHARMACEUTICAL DEGRADATION PATHWAYS AND ANAMMOX ACTIVITY UNDER DIFFERENT CONDITIONS

Moving Bed Biofilm Reactor (MBBR) technology has emerged as a promising solution for removing persistent micropollutants from municipal and industrial wastewater. Despite its growing application, the detailed interactions between biofilm microbial communities and micropollutant degradation under varying redox conditions remain poorly understood. This study investigated the removal efficiency and degradation pathways of 20 commonly used pharmaceutical compounds in MBBR systems operated under two different regimes: fully anoxic and combined aerobic/anoxic conditions. Experimental data revealed that certain pharmaceuticals showed significantly higher removal rates (**92%**) under aerobic/anoxic conditions. In contrast, others were better degraded in strictly anoxic environments, almost **98%**, highlighting the importance of balancing the conditions. First-order kinetic modeling was applied to characterize the degradation behavior of each compound, allowing us to identify distinct removal pathways. Interestingly, metagenomic DNA analysis showed a marked increase in the abundance of anammox-related genes throughout the experiment, suggesting a previously underexplored role of these bacteria in micropollutant transformation. To further examine this, hydrazine—a metabolic intermediate of the anammox pathway—was introduced as a by-product stimulant. The insights gained from this study can guide the development of more efficient and targeted biofilm-based wastewater treatment strategies, with broader implications for sustainable environmental management and emerging contaminant control.

KHACHATRYAN H., *DASHYAN S.*
Scientific Technological Center of Organic and Pharmaceutical Chemistry National Academy of Sciences Republic of Armenia, Yerevan, 0014, 26 Azatutyan ave., Republic of Armenia

MODIFIED CHITOSAN: A PROMISING APPROACH FOR WATER TREATMENT AND FRESHWATER QUALITY

A global water crisis looms, with over a billion people already facing scarcity and projections indicating 3.5 billion could be affected by 2025. By 2040, water demand is expected to outstrip supply by 50%. Despite this urgent need, there's a lack of widely recognized, sustainable water solutions [1]. Chitosan (CS) are emerging as key players in tackling water pollution. It also shows promise as an adsorbent material for wastewater treatment, boasting several advantages [2].
The goal of our scientific research is the development of modified chitosan materials by conjugating them with new heterocyclic compounds bearing amino and carboxylic acid groups. The new products can be promising candidates for wastewater treatment and for improving water quality in freshwater aquatic environments.

1. United Nations World Water Assessment Programme (WWAP). (2024). *The United Nations World Water Development Report 2024: Water for Prosperity and Peace*. UNESCO.
2. Sulaeman, Y., Al-Musawi, T. J., & Al-Amili, M. H. (2024). Recent advances in the preparation, antibacterial mechanisms, and applications of chitosan. *Molecules*, *29*(11), 318.

MENEZES, T.[1], *GANILHO C.[2], SANTOS M.[1], PEREIRA R.[2], PEREIRA C.[1], ANDREANI T.[1,2]*
1 Porto University Chemistry Research Center (CIQUP), Department of Chemistry and Biochemistry, Institute of Molecular Sciences (IMS)—Faculty of Sciences of the University of Porto (FCUP), Porto, Portugal
2 GreenUPorto—Sustainable Agrifood Production Research Centre & INOV4AGRO, FCUP, Porto, Portugal

DTC-LOADED LIPID NPS: DESIGN & ECOTOXICITY ASSESSMENT

See Abstract in poster session

Aquatic marine sub-session

MORIS, V. C. *[1], THIEL, D. [2], BEETS, I. [3], SAUNDERS, L. [4], HARDEGE, J. [5], JÉKELY, G.[4]*

1 University of Brussels, BIOMAR, 1050 Brussels, Belgium
2 Living Systems Institute, University of Exeter, Stocker Road, Exeter, Devon, EX4 4QD
3 Department of Biology, KU Leuven, Leuven, Belgium
4 Centre for Organismal Studies (COS), University of Heidelberg, 69120 Heidelberg, Germany
5Department of Biological and Marine Sciences, Cottingham Road, Hull, HU6 7RX, U.K.

CHEMICAL RECEPTORS IN MARINE WORMS AND IMPACT OF OCEAN ACIDIFICATION ON THEIR CHEMICAL COMMUNICATION

Ocean acidification (OA) has major consequences on the marine ecosystems. However, the impacts of OA on chemically mediated behaviors such as mating and reproduction strategies have often not been studied. We are investigating the impacts of lower pH on chemical communication, and on the reproductive strategies in two sister species of Polychaetes: *Platynereis dumerilii* (spawner) and *P. massiliensis* (brooder). Polychaetes are adequate models to investigate such questions as they are known to highly rely on chemical communication for mating and are found in different pH environments including the acidic CO_2 vents. Fist, we aim to identify the receptors of the pheromones in *P. dumerilii* and then determine if a lower pH impacts their pheromones and/or receptors. For such project, we combine chemical analyses, behavioral assays, receptor deorphanization, physiology, HCR in situ hybridization, SEM imaging, transcriptomics, epigenetics, CRISPRCas9 genome editing, and single cell sequencing. Such study might help to better understand chemosensation in marine annelids determine and how OA will affect marine communities and distribution of species.

SCHLEYER, G.[1], *KRABBE, J., ISHIDA, K., SCHERLACH, K., SYHAPANHA, K., POHNERT, G., HERTWECK, H.*

[1] NIOZ Royal Institute for Sea Research, Department of Marine Microbiology and Biogeochemistry, Texel, The Netherlands

THE METABOLIC CROSSTALK BETWEEN AN ALGICIDAL BACTERIUM AND A BLOOM-FORMING DIATOM

See Abstract in poster session

PRÓFUMO, A.[1,2,3]***,*** *AVILA, C.* [1,2]*, AND CUTIGNANO, A.*[3]

[1]*Universitat de Barcelona (Facultat de Biologia), Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals, Barcelona (Catalonia, Spain)*

[2]*Institut de Recerca de la Biodiversitat (IRBio, Universitat de Barcelona), Barcelona (Catalonia, Spain)*

[3]*Istituto di Chimica Biomolecolare (ICB, Consiglio Nazionale delle Ricerche), Pozzuoli (Napoli, Italy)*

CHEMICAL CHANGES IN ANTARCTIC MARINE SPONGES UNDER HEAT STRESS

Waters around the western Antarctic Peninsula are experiencing fast warming due to global change, being among the most affected regions on the planet. The Southern Ocean is home to a large and rich community of benthic marine invertebrates, such as sponges, tunicates, corals, and many other animals. Among the sponges, *Dendrilla antarctica* is commonly known to produce secondary diterpenoids that are used to defend itself against predators. In this study, we investigated how the chemical composition of this sponge changes in response to gradual increases in seawater temperatures, using controlled aquarium experiments. While this species naturally inhabits variable environments, such as volcanic islands, our findings show that certain compounds increase with the thermal stress. However, when temperatures exceed 4 °C, sponge metabolism is disrupted, leading to premature death. Further research on the roles of all these natural products in *D. antarctica* and their relationship to the sponge resilience to environmental changes should help to better understand the defensive mechanisms of Antarctic marine benthos in the context of global change.

RODRIGUES, M.V.*; FERREIRA, A.; RAMIREZ-MONTOYA, M.; OLIVEIRA, R.A.; DEFAIX, R.; KIS, P.; CABRAL, V.; BRONZE, M. R.; XAVIER, K. B.; VENTURA, M. R.*

ITQB, Universidade Nova de Lisboa, Oeiras, Portugal

QUANTIFICATION OF THE LEVELS OF AUTOINDUCER-2 QUORUM SENSING SIGNAL

Quorum sensing (QS) is a signaling mechanism that regulates gene expression in response to population density. Autoinducer-2 (AI-2) stands out from other QS signals due to its ubiquity across bacteria from different phyla in multispecies communities.[1] Despite its significance, quantification of this signal poses some challenges due to its chemical instability and residual concentration in relevant complex biological settings (e.g. gut microbiota). Our work enabled the quantification of AI-2 using GC-MS with a novel deuterated AI-2 molecule as internal standard, with a limit of detection of 0.03 μM.[2] With this method, we were able to access AI-2 levels in the caecum of mice with different gut microbiota. In conclusion, this work presents a powerful analytical tool for studying AI-2 and creates opportunities for exploring its role in different fields, like health and ecology.

[1] M. V. Rodrigues, P. Kis, K. B. Xavier, M. R. Ventura, *Isr. J. Chem.* **2023**, *63*, e202200091.

[2] M. V. Rodrigues, A. Ferreira, M. Ramirez-Montoya, R. A. Oliveira, R. Defaix, P. Kis, V. Cabral, M. R. Bronze, K. B. Xavier, M. R. Ventura, *Bioorganic Chem.* **2025**, *157*, 108274.

ROGGATZ, Christina, C.

Dynamic Ecological Chemistry – Faculty 2 Biology & Chemistry and UFT - Center for Environmental Research and Sustainable Technology, University of Bremen, Germany

ENVIRONMENTAL PHYSICAL-CHEMICAL IMPACTS ON MARINE SIGNALS AND METABOLITE EXCHANGE

Chemical communication and the exchange of metabolites often require exposure of the compounds to the surrounding environment when they are transferred from the source to the receiving organism [1]. Abiotic factors like temperature and pH vary on spatial and temporal scales, e.g. due to photosynthesis, respiration, tides or seasons. With an innovative combination of methods including physiological/ behavioural assays, microsensor-based measurements, analytical NMR spectroscopy, computational approaches and numerical modelling, I have developed a portfolio of methods to assess the sensitivity of compounds to physical and chemical environmental parameters. Besides exploring effects on fundamental molecular properties such as structure, charge distribution, conformation and stability, it also enables the prediction of a compound's vulnerability to conditions in future oceans. Currently, I investigate micro-environmental impacts on chemical interactions within diatom-bacteria biofilms.

[1] C. C. Roggatz, M. Saha, S. Blanchard, P. Schirrmacher, P. Fink, F. Verheggen, J. D. Hardege, *Glob. Change Biol.* **2022**, *28*, 4495–4505.

DOS SANTOS, M. R.[1,3], *MENEZES, T.* [1], *SANTOS, H. A*[2,3], *PEREIRA, C. M.*[1]

[1] *Chemistry Research Centre and Institute of Molecular Sciences, University of Porto, Porto, Portugal*

[2] *Drug Research Program, Division of Pharmaceutical Chemistry and Technology, Faculty of Pharmacy, University of Helsinki, Helsinki, Finland*

[3] *Department of Biomaterials and Biomedical Technology, The Personalized Medicine Research Institute Groningen (PRECISION), University Medical Center - University of Groningen, Groningen, The Netherlands*

See Abstract in poster session

Terrestrial / Plant sub-session

ROSSI D., *NAVROT, N., GAQUEREL, E.*
Institute of Plant Molecular Biology (IBMP), Strasbourg, France

EXPLORING IRIDOID BIOSYNTHETIC PATHWAYS, DIVERSITY AND BIOLOGICAL FUNCTIONS

See Abstract in poster session

RADAN, M. [1]***,*** *STASIŁOWICZ-KRZEMIEŃ, A.* [2]*, CIELECKA-PIONTEK, J.* [2]*, ŠAVIKIN, K.* [1]
[1]*Institute for Medicinal Plants Research "Dr. Josif Pančić", Tadeuša Košćuška 1, 11000, Belgrade, Serbia*
[2]*Department of Pharmacognosy and Biomaterials, Faculty of Pharmacy, Poznan University of Medical Sciences, Rokietnicka 3, 60-806 Poznan, Poland*

DEVELOPMENT OF ANTHOCYANIN-LOADED ELECTROSPUN NANOFIBERS: OPENING UP A NEW HORIZON FOR THE VALORIZATION OF CHOKEBERRY FRUIT WASTE

See Abstract in Poster session

Terrestrial Systems / sub-session

BELLEC, L., *CORTESERO, A.M. & HERVÉ, M.*
Institute for Genetics, Environment and Plant Protection, Rennes, France

INTEGRATIVE APPROACHES TO DECIPHER THE ROLE OF PLANT CHEMISTRY IN PLANT–INSECT INTERACTIONS

This presentation will explore the chemical and molecular mechanisms underlying host plant selection by herbivorous insects, drawing on research conducted within our group that integrates approaches from chemical ecology, nutritional ecology, and quantitative genetics, alongside analytical chemistry. Within this broad topic, the work presented will focus on three main research lines: i) metabolomic and genetic analyses of plant-insect interactions, particularly to identify strategies to reduce pest pressure on crops (e.g., resistant cultivars and companion plants), ii) ecology and evolution of plant chemistry (e.g., phylometabolomics, within-plant allocation), with a focus on S-methylcysteine sulfoxide, iii) the role of mutualistic and antagonistic insect interactions in shaping plant chemistry. Emphasis will be placed on how these findings can guide the development of more sustainable crop management systems, offering novel insights for pest control.

CATTANEO, Alberto Maria
C3A - Center Agriculture Food Environment, Università di Trento
San Michele all'Adige (TN) - Italy

ALTERNATIVE STRATEGIES BASED ON TRANSGENIC DROSOPHILA MELANOGASTER FOR THE FUNCTIONAL CHARACTERIZATION OF INSECT IONOTROPIC RECEPTORS

Interference with the behavior of insects by targeting their sensing of chemicals represents a promising strategy for IPM-strategies. Among the various chemoreceptors that insects use to sense volatile ligands, the Ionotropic Receptors (IRs) represent an ancestral family of sensors, which activation was up to now obtained, rather by the direct recording from insects' chemosensory neurons, or by their heterologous expression in *Xenopus* oocytes. Alternative methods to study IRs to implement strategies for insect control are urging.

During my most recent research, for the first time, I successfully expressed various IRs from two main fruit pests, the codling moth *Cydia pomonella* and the spotted wing drosophila *Drosophila suzukii*, using transgenic *Drosophila melanogaster* for recording *in vivo* from its antennal olfactory sensory neurons (OSNs), demonstrating binding of pest-IRs to amines and acids. For the first time, my findings highlight the potential use of *Drosophila* OSNs as a valuable tool to study IRs from pest insects and support the use of this method as a suitable system for the IRs' functional characterization.

JOSVAI, J.K., *ERDEI, A.L., HÁRI, K., SZELÉNYI, M.O., KECSKEMÉTI, S., RONKAI, L., PEREGOVITS L.*
Plant Protection Institute HUN-REN ATK, Budapest, Hungary

TEMPORAL CHANGES IN THE VOLATILE PROFILE OF FERMENTED BAITS AND THEIR DIFFERENTIAL ATTRACTION TO INSECT SPECIES

This presentation summarizes recent research on the volatile profiles of fermented wine and their influence on insect behavior. Previous field studies demonstrated that adding red wine to synthetic feeding attractants enhanced captures of noctuid moths, tortricid moths, and social wasps, although the degree of attraction varied by species and lure age. Using advanced analytical techniques such as Solid Phase Microextraction (SPME) and Gas Chromatography-Mass Spectrometry (GC-MS), we characterized key volatiles involved in these responses. Compounds such as ethyl acetate and ethyl octanoate were abundant in fresh baits, while alpha-pinene and limonene appeared consistently or only after bait aging. These findings highlight complex, species-specific behavioral responses to volatile changes over time. Our results have important implications not only for improving environmentally friendly pest management tools, but also for standardizing natural fermented baits widely used in conservation biology and other entomological research, where variability currently limits comparability and reproducibility.

SZELÉNYI M. O.[1], *MOLNÁR B. P.[1], MOLNÁR O.[2], KÁRPÁTI ZS.[1], KECSKEMÉTI S.[1]*
[1]Department of Chemical Ecology, Plant Protection Institute, HUN-REN Centre for Agricultural Research
[2]Department of Plant Pathology, Plant Protection Institute, HUN-REN Centre for Agricultural Research
Budapest, Hungary

FEEDING-RELATED OLFACTORY PREFERENCES OF *RHAGOLETIS COMPLETA*: RESPONSES TO WALNUT SPECIES AND FRUITS

See Abstract in poster session

KOUTSOGEORGIOU, E.I., *KAPRANAS, A., KOULOUSSIS, N. A, ANDREADIS, S.S*
Laboratory of Applied Zoology and Parasitology, School of Agriculture, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece

OLFACTORY DETECTION OF HOST PLANT VOLATILES BY *HALYOMORPHA HALYS*

See Abstract in poster session

VANDERPLANCK, M.[1], *ZANUTTO, J.[1], MOREL, S.[1], VITOU, M.[1], CHORIN, M.[2], LE BRIS, N.[2], RENAULT, D.[2], GREFF, S.[3], SIMMLER, C.[3]*

[1]CEFE, Univ Montpellier, CNRS, EPHE, IRD, 34293 Montpellier, France

[2]EcoBio, Université de Rennes, CNRS, 35042 Rennes, France

[3]IMBE, CNRS, IRD, Aix Marseille Univ, Avignon Univ, Endoume Marine Station, Marseille, France

BEE RESILIENCE IN A CHANGING WORLD THROUGH THE LENS OF SELF-MEDICATION

Facing the current pollination crisis, the need for efficient mitigation strategies to safeguard pollinators has never been greater. However, basic mechanistic knowledge is still lacking to propose and organise such strategies. Indeed, the maintenance of wild bee populations and associated ecosystem services would benefit from a better understanding of how the chemical composition of pollen contributes to the resilience of bees to global changes. The overall goal of my proposed research project is to develop an integrative and interdisciplinary approach to test nutritional resilience to the environmental stressors responsible for oxidative stress (antioxidants/pro-oxidants imbalance) in wild bees, as well as the possibility for self-medication. Specifically, I aim to demonstrate whether all conditions for self-medication against oxidative stress occur in wild bees. This will allow for ultimately testing the hypothesis that bees self-medicate to face oxidative stress induced by global changes. Besides this fundamental framework, the project will allow for proposing nature-based solutions, such as promoting medicative flora, for conserving and enhancing wild bee abundance and diversity.

BLANKERS, T., *FRUITET, E. BURDFIELD-STEEL, E.R., GROOT, A.T.*

Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, The Netherlands

THE GENETIC ARCHITECTURE OF SEX PHEROMONE EVOLUTION IN THE HELIOTHINE MOTH *CHLORIDEA SUBFLEXA*

Sex pheromone are important in divergent evolution. Teir evolution is complex as sex pheromones are often composed of multiple, genetically correlated components. Meanwhile, the function of different sex pheromone components, i.e. major or minor component, aphrodisiac or anti-aphrodisiac, can vary. This then results in conflicting selection pressures on the integrated, multi-component pheromone. One example is in sex pheromone divergence in the sister species *Chloridea virescens* and *C. subflexa*. Levels of one group of components, acetate esters, have diverged because they attract *C. subflexa* males but repel *C. virescens* males, thus reducing heterospecific mate attraction. Meanwhile, the major component is under balancing selection to ensure proper mate recognition. We artificially selected the sex pheromone of *C. subflexa* for higher and lower acetate levels and measured selection responses across pheromone components and in their genetic interactions. We also conducted a genome-wide association study to identify genetic loci underlying experimental pheromone evolution.

WG2 WORKSHOP

Communication systems in invasive species

Examine communication systems in invasive species, including how they may interfere with the sensory systems of native species

Organizers

Conxita AVILA (Co-leader WG2)
Antonios MICHAELAKIS
Maria PAPPAS (Leader WG2)

(26th afternoon)

Program of WG2 workshop

14:00 – 14:15	Eduardo Nuno	**BARATA**
14:15 – 14:30	Alenka	**ŽUNIČ KOSI**
14:30 - 14:45	Magdolna	**SZELENYI**
CHAIR	Antonios	**MICHAELAKIS**
14:45 - 15:00	Júlia Katalin	**JÓSVAI**
15:00 - 15:15	Levent	**CAVAS**
15:15 - 15:30	Deniz	**INNAL**
15:30 - 15:45	Eirini	**ANASTASAKI**
CHAIR	Conxita	**AVILA**
15:45 - 16 :00	Discussion	

BARATA, Eduardo N.
Department of Biology, University of Évora, Évora, Portugal

COMMUNICATION SYSTEMS IN INVASIVE FISH SPECIES: CHEMICAL COMMUNICATION IN MOZAMBIQUE TILAPIA

The Mozambique tilapia is a cichlid native to southeastern Africa. Tilapia species have been introduced around the world for aquaculture and, sometimes, deliberately to control aquatic plant growth. Here, I describe what has been unveiled about the chemical communication system of the Mozambique tilapia. Dominant males actively release urine when confronting competitor males or when courting pre-ovulatory females. The putative urinary pheromones reduce aggressiveness in receiver males and attract females for spawning. Two epimeric glucuronide-conjugated steroids that have been identified in male urine prime final maturation and ovulation in pre-ovulatory females but have no effect on male aggression. Pre-ovulatory female-related odorants, a gonadal glucuronide-conjugated steroid and two bile acids, attract males and induce nest-digging behaviour. The identification of tilapia pheromones might be useful to manage populations that are invasive, farmed or that occur naturally.

GABOR, M., *MAKUC, D.,* ***ZUNIC KOSI, A.***
National Institute of Biology, Ljubljana, Slovenia

CHEMICAL COMMUNICATION AND DUAL ECOLOGICAL ROLE OF *CERAMBYX CERDO*: PEST AND CONSERVATION TARGET

The great capricorn beetle (*Cerambyx cerdo,* Cerambycidae, Coleoptera) presents a compelling case of dual ecological significance: it is both a protected Natura 2000 species and, under certain conditions, a pest of oak forests. Its congener, *C. welensii*, similarly damages oaks in Iberian dehesas. Our research investigates the species' chemical communication via volatile analysis and behavioural bioassays, identifying a male-produced aggregation-sex pheromone that likely plays a role in intraspecific attraction and reproductive isolation. Pheromone-based lures represent an effective, non-invasive method for monitoring *C. cerdo* populations, with promising applications in both pest management and conservation. This case underscores the value of chemical ecology in managing species that straddle the boundary between conservation concern and economic impact.

SZELÉNYI, M. O.[1], *SIMON J.[1], TÓTH Z.[2], SAMU F.[1], SZITA É.[1], THOLT G.[1]*
[1]National Laboratory for Health Security, [2]Department of Zoology, Plant Protection Institute, HUN-REN Centre for Agricultural Research Plant Protection Institute, Budapest, Hungary

ELECTROPHYSIOLOGICAL AND BEHAVIOURAL RESPONSES OF *METCALFA PRUINOSA* TO HOST PLANT VOLATILES

The invasive planthopper *Metcalfa pruinosa* is emerging as a significant concern across various agroecosystems as well as in urban environments. To contribute to the development of sustainable monitoring tools, we examined the species' olfactory responses to plant-derived volatiles. Volatile collections were analysed using gas chromatography–electroantennographic detection (GC-EAD), which identified 29 compounds eliciting antennal activity[1]. Among these, piperitone, DMNT, methyl salicylate, and camphor produced the strongest electrophysiological signals. Behavioural assays in a Y-tube olfactometer revealed that piperitone and camphor were significantly attractive to nymphs, suggesting their suitability as components of synthetic lures. These results provide a promising foundation for the development of semiochemical-based monitoring strategies.

[1]Szelényi, M. O., Erdei, A. L., Molnár, B. P., & Tholt, G. (2024). Antennal olfactory sensitivity and its age-dependence in the hemimetabolous insect Metcalfa pruinosa. Journal of Applied Entomology, 148(4), 424-433.

JÓSVAI. J.K., *EL-SAYED, A., EDWARDS, E., BROWN, R.*
Department of Chemical Ecology, Plant Protection Institute HUN-REN CAR, Budapest, Hungary

COMMUNICATION AND CHEMICAL ECOLOGY OF INVASIVE SOCIAL WASPS: CHALLENGES AND OPPORTUNITIES IN RESEARCH

Social wasps (Hymenoptera: Vespidae) are excellent models to study invasion and rapid adaptation due to their flexible communication. Their success is partly due to a complex olfactory system combining innate responsiveness to general volatiles with learned associations to locally available cues. In introduced regions like New Zealand, wasps became dominant predators, significantly altering native ecosystems and competing with endemic species. It has been demonstrated that populations of *Vespula vulgaris* living in beech forests in New Zealand learn and respond to native beech-associated volatiles, a response absent in their native European range. Such plasticity makes long-term population control challenging, especially in case of social insects, where a single queen can produce hundreds of new queens annually. While chemical ecology based methods can reduce local activity, it provides limited landscape-level impact. Understanding the chemical ecology and learning mechanisms of these insects is critical, but not sufficient alone for mitigation. Proactive monitoring and identifying vulnerable ecosystems remain essential components of invasive species management strategies.

CAVAS, L., *KIRKIZ, I.*
Dokuz Eylül University, Faculty of Science, Department of Chemistry, Main Campus, 35390, İzmir, Türkiye

CHEMICAL COMMUNICATION IN FOULING ORGANISMS

Biofouling is the unwanted accumulation of micro- and macroorganisms on submerged surfaces in the marine environment. This process occurs in several stages, beginning when microorganisms and biomolecules adhere to surfaces to form biofilms. Once biofilms are established, the larvae and spores of other organisms begin to settle on these biofilms, guided by chemical substances that either attract or repel them. The formation of biofilms is regulated by signaling molecules such as cyclic dinucleotides, nucleotides, indole, and quorum-sensing molecules. When organisms attach to a surface, they become sessile, remaining there for the rest of their lifetime. This attachment and settlement process is controlled at the (post-)transcriptional level through the action of regulatory genes. Since biofilm formation represents the initial stage of biofouling, a deeper understanding of this process is essential to effectively combat it. To control biofouling, it is necessary to disrupt quorum sensing and employ anti-biofilm inhibitors. In this study, the biochemical mechanisms underlying biofilm formation were investigated to better understand the biofouling process.

INNAL, Deniz
Burdur Mehmet Akif Ersoy University, Department of Biology, Burdur 15100, Türkiye

THE CHEMICAL FOOTPRINT OF ALIEN SPECIES: TOXICITY IN THE MEDITERRANEAN ECOSYSTEM

In recent decades, there has been a notable increase of alien invasive species (AIS) in Mediterranean ecosystems, primarily driven by human activities. This biological invasion is leading to greater homogenization of regional fauna and flora, significantly threatening native biodiversity. The introduction of AIS is causing emerging public health issues and generating new, shared environmental challenges that have significant ecological and economic consequences for Mediterranean countries. An important, yet frequently overlooked, consequence of these invasions is the introduction of species with toxic characteristics, thus enlarging the 'chemical footprint' of biological invasions. This phenomenon introduces new challenges from a toxicological perspective and is emerging as a direct threat to human health in the area. This presentation intends to outline the species composition of toxic invasive organisms presently established in Mediterranean countries, examine the toxicological aspects of these species, and address their actual and potential effects on public health. This work emphasizes the pressing necessity for cohesive assessment and management strategies to alleviate the escalating chemical and biological threats presented by toxic invasive species in the Mediterranean basin.

ANASTASAKI, E., *PSOMA, A., ORFANOS, S., ANTONATOS, S., LYTRA, I., PAPACHRISTOS, D., MILONAS, P.*

Scientific Directorate of Entomology and Agricultural Zoology, Benaki Phytopathological Institute, Kifissia, Greece

FRUIT VOLATILES AS A KEY FACTOR IN INTRASPECIFIC COMPETITION BETWEEN *CERATITIS CAPITATA* AND *BACTOCERA* SPECIES

The Mediterranean fruit fly, *Ceratitis capitata*, is one of the most polyphagous fruit flies. It has been established throughout the Mediterranean basin with warm, Mediterranean, tropical, or subtropical climates, but populations have now spread to northern areas[1]. *Bactrocera dorsalis* and *Bactrocera zonata*, both of Asian origin, are not yet established in mainland Europe but are rapidly spreading towards it. The data on tephritid invasions seem to support a hierarchical mode of competition; however, complete exclusion usually did not occur. Tephritid distribution and abundance are markedly structured by various abiotic and biotic factors[2]. We aimed to document the volatile profile of oranges following infestation by a well-established fruit fly, *C. capitata*, and the two invasive species, *B. dorsalis*, *B. zonata*, for the Mediterranean basin area, to identify the key components of the 'volatile infestation-fingerprint', and to elucidate its specificity (fruit fly or host-fruit species), to better understand the behavioural and chemical interference mechanisms.

[1]EPPO, global database, [2]Duyck, P. F., P. David, and S. Quilici. 2004, Ecol. Entomol. 29: 511–520.

GENERAL TALKS

-1-

Thursday 26th June afternoon

(Marine and general chemical ecology)

Program

16:30 - 16:45		Atle Magnar	**BONES**
16:45 - 17:00		Peter	**SCHUPP**
17:00 - 17:15		Giovanna	**ROMANO**
17:15 - 17:30		Pavel	**STOPKA**
17:30 - 17:45		Stefan	**SCHULZ**
17:45 - 18:00		Ljubodrag	**VUJISIĆ**

Chair: Stefano Colazza

BONES, Atle M.
Cell, Molecular Biology and Genomics Group, Department of Biology,
Norwegian University of Science and Technology, Trondheim, Norway

A GLIMSE INTO THE PHYSIOLOGICAL AND MOLECULAR RESPONSES OF MARINE DIATOMS UNDER STRESS.

Diatoms are unicellular marine microalgae characterized by their silica cell walls, which can be highly ornamental with their nanosized pores and patterning. These micrometer size organisms are an important part of marine primary production and as a group diatom stands for approx. 20% of global photosynthesis. There are thousands of species of diatoms and their genetic inventory is highly variable. We have set out to uncover diatom stress tolerances and some of the mechanisms behind. A tool-box have been established for physiological, genomic and functional genomics analyses and a series of experiments have been executed. Many of them are based on past and present anthropogenic activities likely to affect life in the oceans. Most of the experiments were carried out with the model species *Phaeodactylum tricornutum*. We discovered mechanisms of adaptation to stress, as well as some of the main molecular control systems. Examples of these experiments and characterization of the molecular processes involved will be presented.

FIEGEL, L.J., NIETZER, S., BREFELD, D., KELLERMANN, M.Y., ***SCHUPP P.J.***
Environmental Biochemistry, Institute for Chemistry and Biology of the Marine Environment (ICBM), Carl von Ossietzky Universität Oldenburg, Germany

THE BACTERIA-DERIVED PIGMENT CYCLOPRODIGIOSIN IS A MULTISPECIES SETTLEMENT CUE FOR SCLERACTINIAN CORAL LARVAE

The ongoing climate change is leading to frequent mass bleaching events, which represents the greatest threat to tropical coral reefs today. Sexually reproduction in scleractinian corals is a major driver of natural coral reef adaptation towards changing environmental conditions. A crucial step in the coral life cycle is the transformation of mobile larvae into sessile recruits. Recently, the CCA-associated bacteria-derived pigment cycloprodigiosin (CYPRO) was identified as potent settlement inducing compound (cue) for larvae of *Leptastrea purpurea*. In this study, we investigated whether CYPRO is a general settlement cue by testing eight different spawning and brooding scleractinian coral species belonging to the genera *Leptastrea* and *Acropora*. Competent larvae were exposed to purified CYPRO in different concentrations and settlement determined after 24 and 48 h. All species tested settled in a concentration-dependent manner, although success rates varied between13% to 87% between species. Our findings suggest that CYPRO appears to be a general settlement cue for scleractinian coral species which makes it a promising candidate for novel approaches of coral reef restoration.

ROMANO, G., *BARBARINALDI, R., DI COSTANZO, F., OREFICE I., CAROTENUTO I., DI DATO, V.*

Ecosustainable Marine Biotechnology Department, Stazione Zoologica Anton Dohrn, Napoli, Italy

CHEMICAL SIGNALING IN PLANKTON: COPEPODS AFFECT PROSTAGLANDINS METABOLIC PATHWAY IN DIATOMS

Prostaglandins (Pgs) are eicosanoid lipid mediators detected in all vertebrates, in some marine invertebrates, macroalgae and recently in diatoms[1], a class of eukaryotic microalgae. Enzymes involved in the Pgs pathway are differentially expressed in two strains of the diatom *Skeletonema marinoi*, named FE7 and FE60, also known to produce different levels of oxylipins, secondary metabolites involved diatoms defence against copepod predation. In the present study we evaluated the response of genes involved in the production of oxylipins and Pgs, after the exposure to the copepod *Temora stylifera*. Our results highlighted a feeding preference for FE60, the strain with lower oxylipins content and lower expression of Pgs enzymes. We also showed an impact on the expression of genes involved in oxylipins (i.e. lipoxygenase) and Pgs (i.e. cyclooxygenase) biosynthesis, especially in the FE7 clone. These results provide preliminary indications regarding the existence of a complex involvement of the Pgs pathway in the prey-predator interaction that requires further investigations.

[1]Di Dato, et al., 2017. Animal-like prostaglandins in marine microalgae. ISME J. 11, 1722–1726.

STOPKOVA, R. ***& STOPKA, P***

Department of Zoology, Faculty of Science , Charles University, BIOCEV

MOLECULES FOR LIFE: MAMMALIAN METABOLITES IN SOCIAL BEHAVIOUR

The talk aims at elucidating the links between biodiversity, chemical signals and olfaction. We will present results of the analysis of odour profiles and olfactory receptors and olfactory mucosa in mammals to find how evolutionary forces shaped odour profiles. We will specifically focus on the differences between sexes in closely related species within selected species of mammals (e.g. wood mice, mice, voles etc.). These results will be presented to show major knowledge gaps in chemical ecology, including multiple names for the same compound and how to solve it. We will also demonstrate how to integrate metabolomes, proteomes and transcriptomes using various bioinformatics tools.

SCHULZ, S., *MÖLLERKE, A., KUHN, J., STELL, M.*
Institute of Organic Chemistry, TU Braunschweig, Braunschweig Germany

THE UNKNOWN CHEMISTRY AND CHEMICAL ECOLOGY OF COLLEMBOLA

Although the soil-dwelling Collembola are important arthropods occurring in large numbers contributing to soil healthiness, their Chemical Ecology has largely been neglected. They constitute a sister lineage to the Insecta, but the common precursor dates back to more than 450 Mya. This long-time lead to surprising differences in the secondary metabolites of these lineages that will be discussed. We focused in our studies on three aspects important for Chemical Ecology, epicuticular lipids, defense compounds, and volatile signals. Several difficulties must be overcome when working with these animals, namely their small size, difficult and slow rearing, and often uniform appearance. However, with trace analytical techniques and chemical synthesis we could show that springtails rely often on the terpenoid biosynthetic pathway for both epicuticular lipids and signals. For defence, compound classes are produced that are not known from other genera. In the presentation we will give a short overview on some aspects of the fascinating Chemical Ecology of springtails.

VUJISIĆ, Lj., *KRSTIĆ, G., SOFRENIĆ, I., ANĐELKOVIĆ, B.*
University of Belgrade -Faculty of Chemistry, Studentski trg 12-16, 11000 Belgrade, Serbia

INTRODUCTION TO NATURAL PRODUCT CHEMISTRY FROM CIA LABORATORY

This talk will focus on natural product research conducted at the Center for instrumental analysis (CIA) at UBFC. The research covers various metabolites from plants, mushrooms, millipedes and centipedes, ground beetles and fruit flies. In addition, the application of various instrumental techniques in chemical analysis will be covered. The focus will be on defensive secretion of millipedes and centipedes. Based on their chemical composition of defensive secretion it could be classified into several groups: hydrogen cyanide and its precursors (e.g. mandelonitrile); benzoquinones and hydroquinones; cresols and related phenols; quinazolinone alkaloids (glomerin and homoglomerin); heterocyclic amines and imines (e.g. polizonamine). In addition to these common groups, we recently reported a new type of vinyl ketones from secretion of two julids from Azerbaijan and Iran. This pelargonium- or garlic-like strong odour (different subjective explanation of the odour) is remarkably long-lasting. Authors acknowledge scientific cooperation with colleagues from Faculty of Biology (UB) and from University of Graz.

GENERAL TALKS

-2-

Friday 27th June morning

(Microbiology)

Program

9:00 – 9:15		Danillo	**ALVARENGA**
9:15 – 9:30		Kathrin	**ROUSK**
9:30 – 9:45		Katarina	**KARAMANOLI**
9:45 – 10:00		Paolina	**GARBEVA**
10:00 – 10:15		Ines	**MANDIC MULEC**
10:15-10:30		Ivana	**CAREV**

Chair: Henrik T. Simonsen

ALVARENGA, D.O., *ROUSK, K.*
Terrestrial Ecology Section, University of Copenhagen, Denmark

HOST CONTROL OF NITROGEN FIXATION IN CYANOBACTERIA-PLANT SYMBIOSES

Although N makes up 78% of the atmosphere, most organisms cannot use it directly, instead relying on symbioses with N_2-fixing microbes. Most N_2 fixation is restricted to anaerobic environments due to oxygen inhibition, but some cyanobacteria produce cells called heterocytes that create ideal conditions for nitrogenase activity, making them attractive symbiotic partners. Several plants have independently evolved the ability to recruit cyanobacteria when going through N starvation by manipulating their morphophysiology, but the extent of their influence over their symbionts is still unclear. In this work, we evaluated how contact with plants or their extracts affects cyanobacterial N_2 fixation and gene expression using mosses as model hosts. Contact with hosts led to sharp increases in heterocyte frequency, N_2 fixation and the overall expression of amino acid biosynthetic genes, but also to a significant reduction in the expression of genes for sulfur-containing amino acids. Similar increases in fixation rates were also induced by alcohol-based moss extracts. This suggests that N-starved plants may release metabolites capable of enhancing cyanobacterial N_2 fixation as well as modulate their metabolic profile.

ROUSK, Kathrin
Department of Biology, Centre for Volatile Interactions, University of Copenhagen, Copenhagen, Denmark

MOSSES AS HOSTS TO NITROGEN-FIXING BACTERIA: UNCOVERING BIOTIC AND ABIOTIC CONTROLS

Nitrogen (N) is essential for all life. The key process by which 'new' N enters natural ecosystems is N fixation performed by certain bacteria and archaea (diazotrophs). While much attention has been given to free-living diazotrophs in soil and leguminous-diazotroph associations, moss-diazotroph partnerships remain surprisingly understudied – despite their key contribution to ecosystem N input in moss-dominated habitats, from tropical cloud forests to arctic tundra.

In this talk, I will share insights from a series of field and laboratory studies exploring the abiotic (i.e. climate) and biotic (i.e. moss host) drivers of moss-associated N fixation. Our findings reveal that humidity is a universal regulator of this process, regardless of biome. Moreover, co-inoculation experiments show no strong host specificity, suggesting that moss-diazotroph associations are largely opportunistic – which makes them an ideal model-system for studying the evolution of symbiotic interactions. These results challenge assumptions about plant-microbe specificity and highlight mosses as key, yet overlooked, players in global nitrogen cycling.

TRIANTAFYLLOU, A., ***KARAMANOLI, K.***
Laboratory of Agricultural Chemistry, School of Agriculture, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece

VOLATILOMES IN THE INTERPLAY AMONG PEPPER PLANTS, A PLANT GROWTH PROMOTING BACTERIAL STRAIN, AND *Verticillium dahliae*

Plants interact with their neighbours in versatile ways by attracting, deterring or even killing interaction partners. In this interplay, rhizobacteria affecting plant growth, known as Plant Growth-Promoting Rhizobacteria (PGPR) can play crucial roles as biological agents against pathogens and other enemies. The contribution of VOCs derived from PGP strains in these processes are still mostly unknown. Under this scope, volatilome produced in the pathosystem pepper plants - *Chryseobacterium aquifrigidense* strain SAESo14 - *Verticillium dahliae* was evaluated. In particular, the three organisms were co-cultivated and VOCs emitted by pepper plants infected with *V. dahliae* and treated with PGP strain SAESo14 were analyzed by gas chromatography mass spectrometry (GC-MS) coupled with In-Tube Extraction Dynamic Headspace (ITEX-DHS). As indicated by the results, the volatilome of infected plants differed from that of healthy plants, constisted mostly by aldehydes, such as heptanal and octanal as well as by lipoxygenase pathway derivatives, while treatment with SAESo14 enhanced terpenoid metabolism, and derivatives such as cineol, elemene and sclarene were determined.

GARBEVA, Paolina
Department of Microbial Ecology, The Netherlands Institute of Ecology, Wageningen, the Netherland

THE IMPORTANCE OF VOLATILE COMPOUNDS IN PLANT-MICROBE INTERACTIONS

Many soil microbes produce a range of structurally and functionally various volatiles. These microbial volatiles have been reported to affect many different types of target organisms but the most studied belowground volatile-mediated interactions are the interactions between bacteria, fungi and plants. Regarding the effect of microbial volatiles on plants, most microbial volatiles have shown positive impact on plant health and only a few exceptions of phytotoxic volatiles have been reported.
In my talk I will give examples on the impact of volatile compound in belowground plant-microbe interactions. In recent years, we accumulated evidence that microbial volatiles have a strong biological effect on plants and their pathogens, turning microbial volatiles from overlooked metabolites to potential bioactive compounds for crop health.

MANDIĆ MULEC I., *PODNAR E., ŠIMUNOVIĆ K., ŠTEFANIČ P., KRAIGHER B., BELCIJAN_PANDUR K., DOGŠA I., DANEVČIČ T., LORIES B., TATTI F., MICHELINI S., STEENACKERS H., and DROBNE D.*

University of Ljubljana, Biotechnical Faculty, Department of Microbiology, Ljubljana, Slovenia

INTERACTION DEPENDENT CUES SHAPE BACTERIAL ECOLOGICAL ADAPTATIONS

Microbial interactions are key drivers of microbial ecology and play a crucial role in the development and application of biotechnological and biocontrol strategies. We focus on bacterial interactions using spore-forming beneficial bacteria (*Bacillus subtills*) to investigate the mechanisms and ecology of both intraspecific and interspecific (pathogen – probiotic) interactions. We find that *B. subtilis* exhibits highly precise intraspecific cell-cell communication and kin discrimination, which shape its social adaptations. Moreover, the ecological adaptations of B. subtilis are highly dependent on nutrient availability. Under nutrient-rich conditions *B. subtilis* inhibits pathogen fitness, whereas under nutrient-limitation it avoids attack and sporulation, prioritizing spore quality over spore quantity. Finally, we observed that the pathogenic, but not probiotic strain induces structural changes in the epithelial cells- indicative of stress response, which may have consequences for applications of probiotics.

ŠTEFANIČ et al, Nature comm, 2021; doi.org/10.1038/s41467-021-23685-w; PODNAR et al, The ISME J., 2025, DOI: 10.1093/ismejo/wraf052.

CAREV, Ivana

Faculty of Chemistry and Technology, University of Split

INNOVATION AND KNOWLEDGE SHARING IN BIOACTIVE NATURAL COMPOUNDS RESEARCH

Natural compounds with antimicrobial properties represent a key interface between biochemical function and ecological interactions. In my research, we isolate and characterize bioactive molecules from plant resources, with a focus on their role as antimicrobial agents. Using a combination of chromatographic and spectrometric methods (GC-MS) and biological assays on pathogenic strains, we assess antimicrobial potency and mechanisms of action. Understanding how these molecules function ecologically enhances our ability to identify new antimicrobial agents and elucidate chemical communication pathways. This work contributes to E-NICHE's mission by bridging natural product chemistry and microbial ecology, and by fostering innovation through translational research and collaboration. The aim of the talk is to encourage knowledge sharing and support sustainable antibiotics discovery based on natural products and phytochemistry research.

GENERAL TALKS

-3-

Friday 27th June morning

(Plants)

Program

11:00 – 11:15		James	**BLANDE**
11:15 – 11:30		Anna	**JIROŠOVÁ**
11:30 – 11:45		Moe	**BAKHTIARI**
11:45 – 12:00		Anne-Marie	**CORTESERO**
12:00 – 12:15		Peter	**TÓTH**

Chair: Sylvie Baudino

BLANDE, James D.
University of Eastern Finland, Kuopio, Finland

PLANT-PLANT INTERACTIONS IN SCOTS PINE

Plants can detect and respond to volatile organic compounds (VOCs) released by their neighbours. Herbivore-induced plant volatiles (HIPVs) have been shown to elicit defence-related responses in neighbouring plants. This is indicative of a plant being able to tailor responses to a perceived threat. We have observed that Scots pine seedlings can respond to HIPVs induced by stem-feeding weevils, with a raft of responses including the emission of VOCs, the priming of VOCs and the upregulation of stomatal conductance and photosynthesis. Interestingly we have also observed that the secondary organic aerosol (SOA) derived from reactions between HIPV emissions and atmospheric oxidants can elicit responses in Scots pine seedlings. These responses appear to be subtly, but importantly, different, with SOA priming seedlings for enhanced emissions of VOCs, but not inducing this particular response directly. Here, I will present some new results on Scots pine responses to VOC cues and discuss the significance of our observations in the context of the capacity of plants to decode complex chemically-encoded information.

JIROŠOVÁ A., *STŘÍBRSKÁ B., BASILE S.*
Faculty of Forestry and Wood Sciences, Czech University of Life Sciences, Kamýcká 129, 165 00 Praha 5 – Suchdol, Czech Republic

BARK BEETLES/NORWAY SPRUCE INTERACTIONS – IN CLIMATE CHANGE CONDITIONS.

To investigate how sudden stress influences the susceptibility of Norway spruce (*Picea abies*) to bark beetle attack, we conducted two field experiments simulating drought conditions. In 2021, five rain-exclusion roofs were installed in a research forest to induce acute water stress in selected trees. Throughout the vegetation period, sap flow, stem growth, and bark temperature were continuously monitored using sensors, while bark cores and twigs were periodically sampled for biochemical analyses. Additionally, the trees received an annual treatment with methyl jasmonate, a hormone analogue known to trigger plant defense responses. Bioassays with live bark beetles were performed to assess tree attractiveness and acceptance by the insects. Our objective is to elucidate whether, and through which physiological and biochemical mechanisms, drought-induced stress increases spruce vulnerability to bark beetle infestation.

Basile, S., Stříbrská, B., Kalyniukova, A., Hradecký, J., Synek, J., Gershenzon, J., & Jirošová, A. (2024). Physiological and biochemical changes of Picea abies (L.) during acute drought stress and their correlation with susceptibility to Ips typographus (L.) and I. duplicatus (Sahlberg). Frontiers in Forests and Global Change, 7, Article 1436110. https://doi.org/10.3389/ffgc.2024.1436110

BAKHTIARI, M, *EISENRING, M., GOSSNER, M.*
Laboratory of Forest Entomology, Swiss Federal Institute for Forest, Snow and Landscape Research Zurich, Switzerland

EFFECT OF MICROCLIMATIC GRADIENTS IN TREE CROWNS ON PLANT CHEMISTRY & PLANT-HERBIVORE INTERACTIONS

Due to their size and vertical stratification, mature trees possess pronounced vertical gradients in temperature and light conditions. These within-tree microclimatic gradients have been associated with variation in leaf chemistry and herbivory. To quantify the relationship between within-tree microclimatic variation, phytochemistry, and herbivory, and to understand to what extent light and temperature gradients contribute to within-tree variation in leaf chemistry, and herbivory, we used Pedunculate oak *Quercus robur* colons that display an endogenous rhythmic growth that is characterized by multiple alternating root and shoot flushes which can vary in defense chemistry and insect attacks. We placed clonal saplings on platforms that were raised to three different heights within mature *Q. robur* trees to see how the saplings would respond to changes across the natural environment of the ground, middle canopy, and upper canopy. We performed feeding bioassays with leaves collected at two different growth stages with spongy moth caterpillars and performed untargeted and targeted metabolomic analysis of the leaves. Our results showed that both saplings' leaf chemistry & herbivore resistance differed depending on the growth stage and canopy exposition.

CORTESERO, A.M., *BELLEC, L., GIGUERE, T., TIXERONT, M. & HERVÉ, M.*
Institute for Genetics, Environment and Plant Protection, Rennes, France

METABOLITES INVOLVED IN HOST PLANT SELECTION IN DIFFERENT OLIGOPHAGOUS SPECIES SPECIALIZED ON BRASSICACEOUS PLANTS

Plant produced metabolites play an essential role in host selection by phytophagous insects at distance and upon contact. Unravelling the nature and behavioral effect of these compounds is essential to understand plant insect interactions but also to develop new behaviorally based strategies to control insect pests or select resistant varieties. Key findings from several studies conducted in our group on different species specializing on brassicaceous plants and considered as important pests of oilseed rape will be presented. Different behavioral tests coupled with chemical analyses, allowed us to identify a series of metabolites acting on different steps of host plant recognition in these species and lead to promising perspectives for their control. While host plant selection by phytophagous insects has been studied for decades, many open questions remain both to understand how plant metabolites shape specialization in these insects and to use them for developing future applications in crop protection.

TÓTH, P. [1,2]***,*** *HUIZINGA, S., BOUWMEESTER, H.*
[1]*bioTomal, Rúbaň 176, Slovakia;*
[2]*International Network of Eco-Regions, Salerno, Italy*

THE CHANGING INTERACTIONS OF PARASITIC PLANTS DEPEND ON THE ENVIRONMENT

There are constantly ongoing interactions between plants and their outside world. They mostly use volatile organic compounds for this form of communication. This study aimed to investigate the volatile compounds of the parasitic red-yellow broomrape (*Orobanche flava*). We collected floral volatiles using dynamic headspace stripping at eleven different sites in Slovakia and subsequently analysed them using gas chromatography and mass spectrometry. At the same time, we observed the insects that visited the individual broomrapes. We found clear differences in the floral scent phenotype and pollinator composition between lower and higher mountain valleys, suggesting different ecotypes of O. flava. We present new volatile compounds and pollinators of *O. flava*. We discuss significant variations in floral volatiles. The clear differences in floral scent chemistry and the corresponding grouping of pollinators between broomrapes in different regions suggest the potential for pollinator-mediated selection across the geographical distribution of this species.

GENERAL TALKS

-4-

Friday 27th June afternoon

(Plants-Insect & Applied Chemical Ecology)

Program

14:00 – 14:15		Stefano	**ANDREADIS**
14:15 - 14:30		Cesar	**GEMENO**
14:30 - 14:45		Apostolos	**KAPRANAS**
14:45 - 15:00		Dejan	**PRVULOVIC**
15:00 - 15:15		Guy	**POLTURAK**

Chair: Maria Pappas

KOUTSOGEORGIOU, E.I., NAVROZIDIS, E.I., KAPRANAS, A., KOULOUSSIS, N.A.,
ANDREADIS, S.S.
Institute of Plant Breeding and Genetic Resources, ELGO "Dimitra", 57001, Thermi, Greece

EVALUATION OF COLOR AND STRUCTURE OF DIFFERENT PHEROMONE-BAITED TRAPS FOR ATTRACTING *HALYOMORPHA HALYS* (HEMIPTERA: PENTATOMIDAE)

The brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae), is a significant agricultural pest with a high dispersal capacity and a wide host range. This study evaluates the influence of trap color and design on *H. halys* captures over three consecutive years in a kiwifruit orchard. Each year, two different baited trap types were deployed in the experimental orchard and compared: (1) green rocket versus clear sticky traps, (2) green rocket versus black pyramid traps, and (3) black versus yellow pyramid traps. Results indicate that green rocket traps consistently captured more adults than clear sticky and black pyramid traps, while yellow pyramid traps outperformed black ones. Adult captures were significantly influenced by trap color, with green and yellow traps outperforming black ones each season, whereas nymphal captures were possibly primarily affected by trap structure. The findings highlight the importance of integrating chemical, visual and structural cues in monitoring strategies for *H. halys*, though further research is needed to assess interactions with additional environmental factors.

GEMENO, Cesar
Grapevine and Wine Research Institute (ICVV-CSIC), Logroño, Spain

SEMIOCHEMICAL MANAGEMENT OF GRAPEVINE PESTS

Semiochemicals are an integral part of pest management programs. They are used both to monitor and to control insect pests, employing different methods such as trapping, mating disruption, attract and kill, push and pool, etc. Grapevines are host to a large number of insect and mite pests that require regular insecticide treatments to keep them under control. Semiochemical attractants are used to monitor some grapevine pests, reducing insecticide treatments by means of more timely applications. The European grapevine moth (EGCM) *Lobesia botrana* (Lepidoptera: Tortricidae), is a primary worldwide example of the success of pest control by means of mating disruption. Several other grapevine pests are managed with the help of semiochemicals, but many others are not. This talk will present an analysis of the present and future of semiochemical management of grapevine pests.

KAPRANAS[1], A., *KOKKARI[1], A., ANDREADIS[2], S., DEKKER[3], T., ANASTASAKI[4], E., MILONAS[4], P.*

1. School of Agriculture, Aristotle University of Thessaloniki, Thessaloniki, Greece, 54636
2. Institute of Plant Breeding and Genetic Resources, Directorate General of Agricultural Research, Hellenic Agricultural Organization "Dimitra", 57001 Thermi, Greece
3. National Species Management, Costerweg 1w, Wageningen, The Netherlands
4. Scientific Directorate of Entomology and Agricultural Zoology, Benaki Phytopathological Institute, 8 Stefanou Delta Street, 14561, Kifissia, Greece

THE USE OF ATTRACT AND KILL METHOD FOR THE SUSTAINABLE CONTROL OF THE SPOTTED WING DROSOPHILA SWD *DROSOPHILA SUZUKII*

Drosophila suzukii Matsumura (Diptera: Drosophilidae) is a worldwide invasive pest of soft-skinned fruits. In this study, we evaluated an attract-and-kill (A&K) method using olfactory (lure) and optical (red dye) stimuli in a SPLAT formulation Specialised Pheromone and Lure Application Technology paired with Spinosad®. Field trials were conducted in a vineyard and a cherry in northern Greece and the effect of treatment was assessed with trap catches. The results showed that the attract-and-kill method (A&K) treatments reduced *D. suzukii* populations compared to control plots. In the treated plots, the population remained constant, while in the control plots, the number of individuals increased towards veraison. The treatments had also an impact on other *Drosophila spp*. and therefore the specificity of the lure is discussed. The potential of A&K as an ecologically friendly approach to *D. suzukii* management in Greek orchards is highlighted by this study.

PRVULOVIĆ, D.[1], *GVOZDENAC, S.[2], KOLAROV, R.[1]*

1 Faculty of Agriculture, University of Novi Sad, Novi Sad, Serbia

2 Institute of Field and Vegetable Crops, National Institute of the Republic of Serbia, Novi Sad, Serbia

BIOLOGICAL ACTIVITY OF STINGING NETTLE EXTRACTS: INSECTICIDAL POTENTIAL AND ALLELOPATIC EFFECTS

Stinging nettle (*Urtica dioica* L.) is a rich source of bioactive compounds that act against insect pests, weeds, nematodes, pathogens and express allelopathic effect on crop seeds (inhibitory or stimulatory). Biological activity of stinging nettle ethanol extracts was assessed against *Plodia interpunctella* and *Sithophilus oryzae,* some of the the most destructive storage pests of sunflower, as well as its allelopathic activity on sunflower seeds. The nettle extract significantly inhibited progeny production of both *P. interpunctella* (after 90 days) and *S. oryzae* (after 60 and 90 days). Additionally, stinging nettle extracts had negative allelopathic (phytotoxic) effects - decrease germination and germination energy of seeds, interfere with enzymatic system and induce oxidative stress of sunflower seedlings.

POLTURAK, G., *CHANDRA MISRA R., AL-DEMERDASH A., STEPHENSON M.J., OWEN C., RONEN A., ROSENTHAL M., NICHOLSON P., UAUY C., OSBOURN A.*

Guy Polturak lab, Rehovot, Israel

A GENOMICS-DRIVEN SEARCH FOR NOVEL CHEMICAL DEFENSES IN CEREAL CROPS

Phytoalexins are specialized metabolites that play a crucial role in plant defense response. Similarly to other plant specialized metabolites, their biosynthetic pathways are in some cases encoded by co-localized genes that form biosynthetic gene clusters (BGCs). Discovery of BGCs responsible for phytoalexin production can significantly facilitate delineation of their biosynthesis and function. We employed a genomics-driven approach for systematic identification of several stress-induced candidate BGCs in wheat and in barley. Combinatorial heterologous expression experiments via agroinfiltration in *Nicotiana benthamiana,* coupled with GC/LC-MS and NMR analyses, have enabled us to identify the metabolites that they produce and to fully elucidate the biosynthetic pathways encoding these metabolic products. Several novel compounds were identified, including diterpenes, triterpenes[1], and flavonoids[2], with their suggested defense-related roles further substantiated by *in vitro* antimicrobial assays.

[1]Polturak et al., (2022) Pathogen-Induced Biosynthetic Pathways Encode Defense-Related Molecules in Bread Wheat. *PNAS* 119(16) e2123299119

[2]Polturak et al., (2023) Discovery of isoflavone phytoalexins in wheat reveals an alternative route to isoflavonoid biosynthesis. *Nature Communications* 14(1), 6977

POSTER SESSION

1 to 26

(25th afternoon)

Nigar	**ALKAN**	**1**
Ayla	**BILGIN**	**2**
Falko	**DRIJFHOUT**	**3**
Malgorzata	**GRABARCZYK**	**4**
Veaceslav	**KULCIȚKI**	**5**
Luna	**MASLOV BANDIC**	**6**
Antonios	**MICHAELAKIS**	**7**
Jasmin	**SULJAGIC**	**8**
Rita	**VENTURA**	**9**
Anne-Geneviève	**BAGNERES-URBANY**	**10**
Levent	**CAVAS**	**11**
Andrea	**FICKE**	**12**
Andrea	**FICKE**	**13**
Vida	**MALINAUSKIENE**	**14**
Radoslava	**MATUSOVA**	**15**
Nicolas	**NAVROT**	**16**

Cecylia	**WARDAK**	**17**
Laura	**BELLEC**	**18**
Güllü	**KAYMAK**	**19**
ELENI	**KOUTSOGEORGIOU**	**20**
Thacilla	**MENEZES**	**21**
Dorian	**ROSSI**	**22**
Guy	**SCHLEYER**	**23**
Magdolna	**SZELENYI**	**24**
Mayara R.	**DOS SANTOS**	**25**
Milica	**RADAN**	**26**

ALKAN, N., *ALKAN, A., SALİH, B.*
Karadeniz Technical University, Trabzon, TÜRKİYE

HIGH MOLECULAR WEIGHT PHTHALATES IN SURFACE SEDIMENT OF SOUTHEASTERN BLACK SEA

Phthalates (PAEs), used as plasticizers and produced in high volumes, are synthetic chemicals that may exhibit toxicological properties **(1)**. In this study, the levels and spatial distributions of high molecular weight phthalates (HMW), including Bis(2-ethylhexyl) phthalate (DEHP), Dicyclohexyl phthalate (DCHP), Di-n-octyl phthalate (DnOP) and Dinonyl phthalate (DNP), were investigated for the first time in sediment samples collected from 21 stations determined along the coastline (Trabzon, Turkey), including urban deep-sea discharges. The relative abundance of HMW phthalates showed that DCHP, DNP, DEHP were the most dominant compounds in the sediments with contributions of 15.0%, 14.5% and 11.3%, respectively, while DnOP was not detected in the sediment samples at any station.

(1) Net, S., Sempéré, R., Delmont, A., Paluselli, A., & Ouddane, B. (2015). Occurrence, fate, behavior and ecotoxicological state of phthalates in different environmental matrices. Environmental science & technology, 49(7), 4019-4035.

BİLGİN, A.*[1]* *& SANİN, S.[2]*
[1]Artvin Coruh University, Department of Environmental Engineering, Artvin/TURKEY
[2]Hacettepe University, Department of Environmental Engineering, Ankara/TURKEY

MODELING THE BIODEGRADATION KINETICS OF ENDOSULFAN BY MICROBIAL CONSORTIA

The significance of chlorinated hydrocarbon-type pesticides lies not only in their toxicity to non-target organisms but also in their persistence and ability to spread throughout ecosystems over extended periods. In this study, the biodegradation kinetics of endosulfan, a chlorinated organic compound, were investigated. Three microorganisms—*Afipia genosp*, *Sphingomonas yanoikuyae* Q1, and *Methylobacterium rhodesianum*—were isolated from soil using a culture enrichment technique. The biodegradation process of endosulfan was modeled using a first-order kinetic equation. Degradation rate constants were calculated based on first-order kinetics. Because of studies conducted in a batch reactors at pH=6.5, α-endosulfan degradation constant k1=0.111 (r2=0.681), β-endosulfan degradation constant k1 = 0.116 (r2=0.700) and total endosulfan degradation constant k1=0.116 (r2=0.667) are calculated. As a result of studies conducted in a batch reactor at pH=8.4, α-endosulfan degradation constant k1=0.203 (r2=0.991), β-endosulfan degradation constant k1=0.237 (r2=0.974)) and total endosulfan degradation constant k1=0.221 (r2=0.989) are calculated. These results indicate that the β-isomer of endosulfan is more readily biodegraded than the α-isomer.

DRIJFHOUT, F., *GILL, M., KING, B.*
Keele university, Keele, United Kingdom

CONSIDERATIONS WHEN SAMPLING HONEYBEE (*APIS MELLIFERA*) COLONIES FOR VOLATILE ORGANIC COMPOUNDS (VOCS)

Honeybee disease and pests produce VOCs and their early detection could be used for diagnosis and treatment. There are various ways in which these VOCs can be collected but, in most cases, these samplers collect VOCs indiscriminately, and therefore analysis yields valuable data related to VOCs associated with the honeybee colony. The VOC profiles of honeybee colonies were sampled using a variety of samplers (PSP, MonoTraps and Tenax TD) positioned at different locations within colonies and for different time periods. GCxGC TOF-MS was used to determine the most effective position in hive and sampler to detect VOCs associated with disease or pests. The locations of samplers had no statistically significant impact on the number or peak area of VOCs detected. The peak area of honeybee VOCs varied with the type of sampler used. MonoTraps consistently resulted in peaks with the smallest peak areas. PSPs and Tenax TD were comparable for detecting VOCs. These results have demonstrated which type of sampler and location in hives have the lowest burden on colonies and beekeeper to effectively detect specific VOCs.

GRABARCZYK M.*, FIALEK M., WLAZLOWSKA E.*
Department of Analytical Chemistry, Institute of Chemical Sciences, Faculty of Chemistry, Maria Curie Sklodowska University in Lublin, Poland

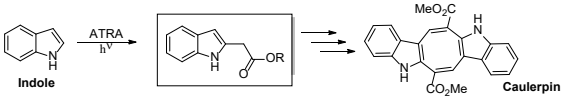
STRIPING VOLTAMMETRY AS A USEFUL TOOL FOR ASSESSING THE QUALITY OF AQUATIC ECOSYSTEMS IN RELATION TO THE DETERMINATION OF TRACE CONCENTRATIONS OF METAL IONS

The stripping voltammetry method is widely used in the analysis of trace concentrations of metal ions in aquatic ecosystems, which is important in assessing water quality. In addition to its high sensitivity, the voltammetric method undoubtedly offers many other advantages, such as short analysis time, low equipment cost, ease of use and low consumption of reagents used in the analysis. In my scientific work, I deal with analytical issues, with particular emphasis on trace and speciation analysis of mainly metal ions in environmental waters using voltammetric methods with various working electrodes. In addition, in the developed procedures, the influence of the environmental water matrix on the analytical signal of the determined metal ions is studied in detail. The presentation will provide examples of developed procedures for the determination of ions such as Cd(II), Ga(III), In(III), V(V) by stripping voltammetry using an environmentally friendly bismuth electrode.

*[1]TOPALĂ, A., [2]MOLLO, E., [1]**KULCIȚKI, V.***
[1]Institute of Chemistry, State University of Moldova, 3, Academiei str., Chișinău MD-2028, Republic of Moldova
[2]Institute of Biomolecular Chemistry, National Research Council of Italy, Pozzuoli, Naples 80078, Italy

A PHOTOCHEMICAL APPROACH TOWARDS CAULERPIN

The bis-indole alkaloid caulerpin isolated from algae of genus *Caulerpa* displayed an array of biological activities. In the chemical ecology context, caulerpin possesses plant growth regulating activity and fish attractant properties. The current methods for caulerpin synthesis are still lacking preparative value, due to either low yields or stoichiometric use of sensitive reagents.



We report a photochemical approach for the synthesis of the indole-2-acetic acid methyl ester – a key intermediate in the synthesis of natural caulerpin. The elaborated synthetic protocol represents a simple procedure, which is performed under room temperature conditions and visible light irradiation, leading to a selective radical addition of acetic acid derivatives to commercial indole. Spontaneous elimination re-generates the unsaturation of the indole fragment.

***MASLOV BANDIĆ, L.,** MIJIĆ, K., BOŠNJAK, D.*
University of Zagreb, Faculty of Agriculture, Svetošimnska 25, Zagreb, Croatia

CHARACTERIZATION OF VOLATILE COMPOUNDS IN MANDARIN FLOWERS FROM NERETVA VALLEY

Floral volatiles play a crucial role in mediating interactions between flowering plants and their ecological partners, including pollinators and herbivores. This study investigates the volatile profiles of flowers from three cultivars of *Citrus unshiu*—'Chahara', 'Okitsu', and 'Saigon'—grown in the Neretva Valley. The objective was to identify and compare the chemical composition of volatile compounds among these cultivars. Headspace solid-phase microextraction coupled with gas chromatography–mass spectrometry (SPME-GC-MS) was employed for the analysis. The results indicated that terpenes were the predominant class of volatiles in all three cultivars, with monoterpenes accounting for 58.57% in 'Chahara', 60.00% in 'Okitsu', and 36.43% in 'Saigon'. Despite the dominance of similar terpene compounds, each cultivar exhibited a distinct aromatic profile, shaped by the specific composition and relative abundance of individual volatiles. These findings highlight notable intra-species variation in floral scent profiles, suggesting that olfactory characteristics among *C. unshiu* cultivars can vary considerably based on their unique chemical compositions.

MICHAELAKIS*[A*], *A., *PAPACHRISTOS*[A], *D., MILONAS*[A], *P., GIATROPOULOS*[A], *A., ZOGRAPHOS*[B], *S.*

[a] *Benaki Phytopathological Institute, Kifissia, Athens, Greece*

[b] *Institute of Chemical Biology, National Hellenic Research Foundation, Athens, Greece*

OVIPOSITION STIMULANT RATHER THAN ATTRACTANT: THE ROLE OF OVIPOSITION PHEROMONE IN *CULEX PIPIENS* BIOTYPE *MOLESTUS* BEHAVIOR

The olfactory system of insects governs essential behaviors, including foraging, mating, and oviposition, with pheromones serving as key mediators. In *Culex* mosquitoes, the mosquito oviposition pheromone (MOP) is released during egg-laying and influences the oviposition choices of other females. This study is the first to explore how MOP affects the oviposition behavior of *Culex pipiens* biotype *molestus*, analyzing males and females separately across different reproductive stages (pre- and post-mating and oviposition). Our findings suggest that MOP primarily functions as an oviposition stimulant rather than an attractant: while gravid females deposited more eggs in MOP-treated containers, the pheromone did not increase the number of mosquitoes (virgin or mated, male or female) captured compared to control water. These results provide new insights into the role of MOP in *Cx. pipiens* reproductive behavior and its potential applications in mosquito surveillance and control strategies.

SULJAGIĆ, J., *SULJKANOVIĆ, M.*

Laboratory of Organic chemistry,Faculty of Technology, Univ. of Tuzla, Tuzla, Bosnia and Herzegovina

APPLICATION OF NATURAL DEEP EUTECTIC SOLVENTS (NADESS) AS GREENER APPROACH TO EXTRACTION OF BIOACTIVE COMPOUNDS FROM BIOMASS

In order to contribute to the United Nations SDGs, researchers usually adjust the conditions within conventional analytical techniques (energy consumption, amount of toxic chemicals, and equilibration time). One alternative approach in extraction techniques is the use of greener versions of solvents of natural origin. Deep eutectic solvents (DESs) have increasingly attracted scientific attention in the last two decades, due to numerous advantages, such as: easy preparation and use, thermal stability, desirable physicochemical properties and adaptability of their structure. Previous studies [1,2] have shown a wide range of successful applications, especially in the extraction of bioactive compounds. In this work, several natural solvents (NADESs) were prepared from natural terpenes, their physicochemical properties and stability were determined, and those with desirable properties for the extraction of bioactive compounds (pigments) from microalgae biomass were tested. The obtained results make the proposed procedure a promising alternative for future applications.

[1] G. Zante, M. Boltoeva, Sustain. Chem. 2020, 1, 238-255.

[2] B. Socas-Rodríguez, M.V. Torres-Cornejo, G. Álvarez-Rivera, J.A. Mendiola, Appl. Sci., 2021, 11, 4897

KIS, P., RODRIGUES, M. V., XAVIER, K. B., ***VENTURA, M. R.***
Instituto de Tecnologia Química e Biológica António Xavier, Universidade Nova de Lisboa, Av. da República, 2780-157 Oeiras, Portugal.

SYNTHESIS AND APPLICATION OF AI-2 DERIVED SUGAR PRODRUGS

Bacteria are able to coordinate the behaviour of cell population by secreting and sensing small molecules called autoinducers. This phenomenon is known as quorum sensing (QS). Among the QS compounds, autoinducer-2 (AI-2) stands out as a potential "universal" bacterial signalling molecule for inter-species communication.[1] It has been shown that AI-2 can be used to mitigate the adverse effects caused by antibiotic-induced microbiota imbalances in the gut.[2] We will present the synthetic strategies towards the preparation of AI-2 prodrugs to orally deliver intact AI-2 to the gut based in colon-specific drug delivery systems. The AI-2 prodrugs consist of AI-2 linked to beta-glycosides that will be specifically hydrolysed in the gut by beta-glycosidases produced by the gut microbiota. The enzymatic release of AI-2 from the new AI-2 prodrugs was demonstrated using mice feces, using a new GC-MS AI-2 quantification method developed by our group [3].

[1] Rodrigues, M. V.; Kis, P.; Xavier, K. B.; Ventura, M. R. *Is. J. Chem.* **2023**, *63*, e202200091.
[2] Pereira, C.S.; Thompson, J.A.; Xavier, K.B. *FEMS Microbiology Reviews* **2013**, *37*, 156-181.
[3] Rodrigues, M. V.; Ferreira, A.; Ramirez-Montoya, M.; Rita A. Oliveira, R. A.; Defaix, R.; Kis, K.; Cabral, V.; Bronze, M. R.; Xavier, K. B.; Ventura, M. R. *Bioorganic Chemistry* **2025**, 157, 108274.

BAGNÈRES, A.-G., *BAUMLIN, C., BALTHAZAR, E., LIEGEOIS, S., BUATOIS, B., PROFFIT, M.*
Centre d'Ecologie Fonctionnelle et Evolutive. CNRS, Univ. Montpellier, EPHE, RD, France

EFFECT OF O_3 AND TEMPERATURE INCREASE IN A CONTEXT OF GLOBAL CHANGE ON BUMBLE BEE CHEMICAL COMMUNICATION

It is widely recognized that global change, for instance increase in concentration of air pollutants and temperature, will have major impacts on plant-pollinator interactions. The potential effects of these factors on pollinating insects are little known compared with those on plants. For this purpose, we investigate these effects on the generalist bumble bees *Bombus terrestris (Bt)*, a social insect communicating mainly in a colonial context by contact. In order to evaluate the effect on their chemical communication on acute O_3 exposures, one of the major air pollutants, in a context of increasing temperature, experimentations were conducted under controlled conditions in mesocosms. Individual workers from three colonies of *Bt* were exposed to four different treatments during 3 hours: 27°C and 20 ppb of O_3 (control conditions); 27°C and 120 ppb of O_3; 30°C and 20 ppb of O_3; 30°C and 120 ppb of O_3. After the exposure, each *Bt* was frozen and kept for further analysis. In order to investigate the effects of the treatments on the major compounds involved in their social chemical communication, i.e. cuticular hydrocarbons (CHCs), CHCs were extracted and analyzed using GC-TOF-MS. Results of the acute exposure will be presented in Evora.

CAVAS, L, *YILMAZ-ABESKA, Y., DOGMAZ, S., KIRKIZ, I.*
Dokuz Eylül University, Faculty of Science, Department of Chemistry, Main Campus, 35390, İzmir, Türkiye

DETERMINATION OF RELEASE RATE OF BIOCIDES IN ANTIFOULING PAINTS

Antifouling paints are used to prevent fouling organisms from attaching to surfaces such as ship hulls, docks, and pipes. Traditional antifouling coatings achieve this by incorporating biocides into their formulations. However, the excessive use of biocides in marine environments can negatively impact biodiversity and ecosystem health. As a result, the release rate of biocides has become a critical topic in environmental risk assessment studies. This study aims to present our national project titled "Determination of Release Rates of Biocidal Agents in Antifouling Paints," supported by TÜBİTAK (Project Grant #122Z415). The findings from the project highlight the importance of conducting environmental risk assessments of antifouling paints prior to their commercialization.

FICKE, A., *PETTERSSON, M., HARTEVELD, D.O.C., JUNG, T.*
NIBIO, Biotechnology and Plant Health, Ås, Norway

IDENTIFICATION OF VOLATILE ORGANIC COMPOUNDS EMITTED BY RHODODENDRON OR LARCH INFECTED WITH DIFFERENT *PHYTOPHTHORA SPECIES.*

Volatile organic compounds (VOCs) are produced by plants due to changes in their physio-chemical status. Determining emitted VOC profiles could improve timely detection of plant diseases. We have inoculated *Larix kaempferi*) and Rhododendron repens with *P. ramorum, P. ×cambivora, P. plurivora* and *P. cinnamomi* and collected VOCs in 2-3wk intervals. We confirmed successful infection by re-isolating the pathogens from the roots or baiting. Rhododendron and larch plants infected by *P. ramorum* produced phenylethylalcohol and α,α-dimethyl benzenemethanol, respectively. Rhododendrons infected by *P. ×cambivora* emitted copane, methylal and benzene,1,2-difluoro-4-(trifluoromethyl). Larch infected by *P. ×cambivora* emitted both benzene,1,2-difluoro-4-(trifluoromethyl) and 1-methyl-4(1methyl-ethyl)-1,3-cyclohexadiene. Rhododendrons infected by *P. plurivora* emitted methylal and benzylalcohol, while they emitted bis(2-methylpropyl) ester 1,2-benzenedicarboxylic acid,; 4,6-dimethyldodecane, and 1,1'-(1,4-phenylene)bis-ethanone, when infected by *P. cinnamomi*. None of the listed VOCs were found in the healthy control plants.

FICKE, A., *PETTERSSON, M., HARTEVELD, D.O.C., JUNG, T.*
NIBIO, Biotechnology and Plant Health, Ås, Norway

IDENTIFICATION OF VOLATILE ORGANIC COMPOUNDS ASSOCIATED WITH PLANT PATHOGENS GROWN IN PURE CULTURE

Early detection and identification of plant pathogens is critical for effective disease management. Species-specific volatile organic compounds (VOCs) could be used to detect and stop infected plant material during import and identify pathogens in the field. We collected VOCs from 63 single spore isolates, including 40 *Phytophthora* species, *Pythium myriotylum, Py. kashmirense*, *Phytopythium citrinum*, *Pp. litorale*, *Pp. vexans*, *Halophytophthora avicennae*, *Nothophytophthora amphigynosa, N. intricata, Elongisporangium anandrum*, *Fusarium oxysporum* and *Rhizoctonia solani.* Using a stepwise elimination process, we found 117 VOCs associated with the tested isolates. Phenylethyl Alcohol was produced by all 50 species, except for *P. foliorum*, *R. solani*, and *F. oxysporum*. From the 63 isolates, 29 were producing unique VOCs. The *P. ramorum* lineages IC3 and EU2 were the only isolates producing 3-methyl tridecane and Methylal, respectively. However, no VOCs could be identified that were common to all 12 *P. ramorum* lineages tested. In most cases, VOC profiles were different between species and even lineages, making them promising signals for remote disease detection.

MALINAUSKIENĖ, V.,[1] *JURAITYTĖ, G.,*[1] *KUNEIKYTĖ, R.,*[1] *KALĖDA, A.,*[1] *BERNOTAVIČIŪTĖ R.,*[1] *IŠKAUSKIENĖ, M.,*[1] *KEDERIENĖ, V.,*[1] *ŽUKAUSKAITĖ, A.,*[2]
[1]*Department of Organic Chemistry, Faculty of Chemical Technology, KTU, Kaunas, Lithuania*
[2]*Department of Chemical Biology, Faculty of Science, Palacký University, Olomouc, Czech Republic*

SYNTHESIS OF INDOLE DERIVATIVES AND THEIR BIOLOGICAL ACTIVTY

Indole derivatives are commonly encountered in nature. It is known that indole itself has influence on various processes, for example in plants regulating growth direction or in bacteria cells controlling quorum sensing.

Although theoretical calculation programs are increasingly being used for predicting biological activity, they cannot fully replace the testing of real compounds in laboratories. It is still very important to develop synthesis paths and to make libraries of various heterocyclic compounds seeking to gain data for comparison of the theoretically calculated activity results with the activity of the real compounds tested in laboratories. This allows knowledge to be accumulated and the algorithms of such calculation programs to be improved.

In order to strengthen this area of research, it is vital to identify common interests and unifying research areas that are relevant to all partner organizations.

PIRŠELOVÁ, B., STRÁNSKA, K., KUBOVÁ, V., ***MATUSOVA, R.***
Institute of Plant Genetics and Biotechnology PSBC SAS, Nitra, Slovakia

STRIGOLACTONES IN THE ABIOTIC STRESS TOLERANCE OF PLANTS

Strigolactones (SLs) are a new class of plant hormones that are synthesized from carotenoids. More and more studies point to their important role in the adaptation of plants to numerous abiotic and biotic stress factors.

Anthropogenic activities can increase the concentrations of toxic metals in agricultural soils and subsequently endanger food safety. Although it is known that strigolactones increase plant tolerance to abiotic stress, their mechanism of action in the presence of heavy metals is still poorly understood in current research. Cadmium is one of the most toxic heavy metals that seriously threatens food safety and agricultural production worldwide. Due to its high solubility, cadmium can easily penetrate plants, restricting plant growth and reducing crop.

The main objective of our work is to deepen our knowledge on the effect of SL phytohormones (and their analogues and mimics) in alleviating abiotic stress in plants induced by abiotic stress factor (cadmium).

Our work is supported by MVTS SAS for CA22102.

NAVROT, N., *ROSSI, D., GAQUEREL, E.*
Institute of Plant Molecular Biology (IBMP-CNRS), Strasbourg, France

DEVELOPING A NEW MODEL PLANT FOR SPECIALIZED METABOLISM STUDY

Specialized metabolites play a crucial role in plant adaptation to their environment (UV, drought…) and in plant interactions with other organisms such as insects. Among these compounds, iridoids are a family of terpenoids produced by several plant families and acting as a defense against herbivores. Currently, the biosynthesis of these compounds is not fully known. For the last couple of years, we have been building resources focusing on the iridoid pathway and a new model species. After several rounds of selection, we determined *Scrophularia nodosa* as the best candidate for our model. We invested in new generation genome sequencing, detailed transcriptome analysis and thorough metabolomic analysis to generate a complete framework for the study of the biological role of these molecules. We also strongly link our model to the local environment, as *S. nodosa* is present around our lab in Strasbourg. The field aspects, and especially the relations between the species and insects, have been studied in our group and have shown a promising specialized plant-insect relation with larvae from the Cucullia genus. We thus expect our studies to enlighten the biological role of iridoids in the response of the species to its environment.

WARDAK, C., *MORAWSKA, K., PIETRZAK, K.*
Department of Analytical Chemistry, Institute of Chemical Sciences, Faculty of Chemistry, Maria Curie-Sklodowska University, 20-031 Lublin, Poland

NEW TYPE OF POTENTIOMETRIC SENSORS USEFUL FOR MONITORING OF ENVIRONMENTAL SAMPLES

Ion-selective electrodes (ISEs) are the largest and most popular group of electrochemical sensors. At the end of the last century, a new version of their design was introduced, which involved the removal of the internal electrolyte solution (called solid contact ISEs). SCISEs have become easier to handle, use and transport. They are especially useful in envrimental analysis in the measurements performed outside the laboratory. Moreover, miniaturisation of ISEs has become possible which allows the construction of multi-sensor measurement platforms. In this presentation result of the latest research concerning the use of composite and hybrid materials for the development of new solid contact ion-selective electrodes will be presented. The poster will explain why it is so important to use a solid contact, what composite materials are and what types of this materials are known and utilized. The results of research on the impact of a composite material on the most important parameters of selected ISEs. The electrodes we have developed can be analyzed in real samples such as natural water, food and plants. Examples of such applications will also be presented on the poster.

BELLEC, L., *CORTESERO, A-M., GIGUERE, T., DELHAYE, T., FAURE, S., HERVÉ, M.*
UMR IGEPP Université de Rennes, INRAE, Rennes, France

CHEMICAL INSIGHT INTO WHITE MUSTARD RESISTANCE TO THE POLLEN BEETLE

The selection of an appropriate host plant is crucial for phytophagous insects. Among traits that drive host plant selection, specialized metabolites play a key role. The pollen beetle is a major pest of oilseed rape, for which no source of resistance has been identified. Previous studies have shown that white mustard exhibits high levels of resistance to this insect, however, the underlying mechanisms remain unknown. Since pollen beetles reject white mustard after a short walk on flower buds, we investigated the role of perianth chemistry through targeted and untargeted chemical approaches. *S*-methylcysteine sulfoxide, a compound known to deter pollen beetles, was quantified and a bio-guided fractionation was conducted to identify additional deterrent compounds. Several subfractions were found to reduce pollen beetle feeding. Untargeted UPLC-IMS-MS analyses of these fractions revealed potential candidates involved in resistance. These candidates were annotated, and their deterrent effects were validated using artificial diets. These findings represent a significant step toward the transfer of resistance from white mustard to oilseed rape, supporting more sustainable pest control strategies.

KAYMAK, Güllü

Kütahya Health Sciences University, Kütahya, Türkiye

EFFECTS OF QUATERNIUM-15 ON ZEBRAFISH LIVER CELLS AND THE PROTECTIVE ROLE OF VITAMIN E

Quaternium-15 (Q-15) is a preservative commonly used in cosmetic and industrial products. This study investigated the effects of Q-15 on zebrafish liver, as well as the potential protective and restorative effects of vitamin E against its toxicity. Zebrafish liver cell line (ZFL, ATCC® CRL-2643) was exposed to 1 µg/mL Q-15, 10 µg/mL vitamin E (sub-IC_{50} doses), and various combinations for 96 hours. Cell viability and IC_{50} values were determined using the MTT assay with an ELISA reader. Homogenized cell samples were analyzed for biochemical parameters (MDA, GSH, CAT, ACP, ALP). The IC_{50} of Q-15 in ZFL cells was found to be 13.4 µg/mL. Exposure to Q-15 alone increased MDA levels and the enzymatic activities of CAT, ALP, and ACP, while decreasing GSH levels. However, these effects were reversed when vitamin E was administered in combination with Q-15. Biochemical analyses revealed that Q-15 induces oxidative stress in cells. Vitamin E was found to mitigate Q-15 toxicity when co-administered and exhibited restorative effects when applied post-exposure. However, it did not demonstrate a preventive effect against Q-15-induced toxicity. Further research is needed to assess the environmental impact of Q-15 and similar additives in natural ecosystems.

KOUTSOGEORGIOU, E.I., *KAPRANAS, A., KOULOUSSIS, N. A, ANDREADIS, S.S*

Lab. of Applied Zoology and Parasitology, School of Agriculture, Aristotle Univ., Thessaloniki, Greece

OLFACTORY DETECTION OF HOST PLANT VOLATILES BY *HALYOMORPHA HALYS*

Volatile organic compounds (VOCs) released by host plants are essential cues guiding herbivorous insects to suitable feeding and oviposition sites. For polyphagous pests like the brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae), understanding these chemical signals is key to deciphering host-selection behavior. We investigated antennal responses of *H. halys* adults to VOCs emitted by *Actinidia chinensis* var. *deliciosa* 'Hayward' at three phenological stages (BBCH73, BBCH79, BBCH81) under field conditions. Volatile blends were analyzed using gas chromatography-mass spectrometry (GC-MS) and coupled gas chromatography-electroantennographic detection (GC-EAD). Several compounds, including sabinene, α-pinene, nonanal, decanal, and (Z)-3-hexenyl acetate, were detected and elicited antennal responses. Camphor and nonanal were present at all stages and triggered strong electrophysiological activity. The stage-specific presence of sabinene and α-pinene in BBCH79 and BBCH81 suggests their role in host recognition. These findings advance our understanding of semiochemical-mediated host location and identify candidate volatiles for behaviorally based monitoring in kiwifruit cultivation.

MENEZES, T.[1], *GANILHO C.[2], SANTOS M.[1], PEREIRA R.[2], PEREIRA C.[1], ANDREANI T.[1,2]*

1 Porto University Chemistry Research Center (CIQUP), Department of Chemistry and Biochemistry, Institute of Molecular Sciences (IMS)—Faculty of Sciences of the University of Porto (FCUP), Porto, Portugal
2 GreenUPorto—Sustainable Agrifood Production Research Centre & INOV4AGRO, FCUP, Porto, Portugal

DTC-LOADED LIPID NPS: DESIGN & ECOTOXICITY ASSESSMENT

Growing concerns over environmental and health impacts of conventional fungicides have driven the development of safer, sustainable alternatives. Lipid nanoparticles (LN) were engineered to encapsulate 3-methyl-5-phenyl-pyrazoline-1-(S-benzyldithiocarbazate) (DTC), aiming to enhance its potential as a biofungicide. The DTC-loaded LN (LN-DTC) showed spherical morphology and an average particle size of 38 ± 4 nm (TEM). Colloidal stability was maintained over 210 days at 25 °C, with Z-Ave ranging from 134.4 ± 1.1 to 187.8 ± 1.1 nm, PDI between 0.17 ± 0.007 and 0.24 ± 0.01, and ZP from -39.2 ± 0.2 to -53.6 ± 0.8 mV. Encapsulation efficiency reached 99.39%, with a drug loading of 4.39%. Ecotoxicity assays showed low toxicity: *Aliivibrio fischeri* had <82% bioluminescence inhibition. Freshwater species *Raphidocelis subcapitata* and *Lemna minor* had growth inhibition rates of 30% and 29.6%, respectively. These results indicate good physical stability and minimal environmental toxicity. LN-DTC represents a promising and sustainable nanofungicide candidate, combining high antifungal potential with reduced ecological impact.

ROSSI D., *NAVROT, N., GAQUEREL, E.*

Institute of Plant Molecular Biology (IBMP), Strasbourg, France

EXPLORING IRIDOID BIOSYNTHETIC PATHWAYS, DIVERSITY AND BIOLOGICAL FUNCTIONS

Specialized metabolites play a crucial role in plant adaptation to their environment (UV, drought…) and in plant interactions with other organisms such as insects. Among these compounds, iridoids are a family of terpenoids produced by several plant families and acting as a defense against herbivores. Currently, the biosynthesis of these compounds is not fully known. To study iridoid biosynthetic pathways, our group established *Scrophularia nodosa* as a plant model. My study primarily focuses on deciphering the iridoid biosynthetic pathway in *S. nodosa* using transcriptomics, metabolomics and metabolic engineering. From the study of one species, a second part of my work aims at exploring iridoid diversity in the large *Scrophularia* genus (>250 species) using high-resolution metabolomics analysis of a chosen set of representative species. Finally, our *in situ* data from local *S. nodosa* populations showed that the larvae of specialist moth *Cucullia scrophulariae,* from the Noctuidae family, are the main herbivores found on *S. nodosa*. My research thus tries to understand how *Scrophularia nodosa* reacts to herbivory and how *C. scrophulariae* manages *S. nodosa* iridoids.

SCHLEYER, G.[1], *KRABBE, J., ISHIDA, K., SCHERLACH, K., SYHAPANHA, K., POHNERT, G., HERTWECK, H.*

[1] NIOZ Royal Institute for Sea Research, Department of Marine Microbiology and Biogeochemistry, Texel, The Netherlands

THE METABOLIC CROSSTALK BETWEEN AN ALGICIDAL BACTERIUM AND A BLOOM-FORMING DIATOM

Microbial interactions can shape community structure and function in the marine environment. Specifically, bacteria-phytoplankton interactions were suggested to play an important role as biotic regulators of algal blooms. Studies from the past decade highlighted chemical communication as a key aspect in mediating these interactions. Nevertheless, although bacteria are prolific producers of specialized metabolites, the function of such metabolites in bacteria-phytoplankton interactions has been largely overlooked. Moreover, these metabolites have been studied mostly for pharmaceutical purposes rather than their role in nature.

We study the secondary metabolites that mediate the ecologically relevant bacterium-phytoplankton system of *Kordia algicida* and *Skeletonema marinoi*. *K. algicida*, isolated during a bloom of *S. marinoi*, was shown to be algicidal towards the microalgae via the secretion of a protease. Small metabolites were suggested to be involved in the algicidal activity, however, their identity is thus far unknown. Here, I will present a combined targeted and untargeted approach to isolate and identify the secondary metabolites involved in the algicidal activity.

SZELÉNYI M. O.[1], *MOLNÁR B. P.[1], MOLNÁR O.[2], KÁRPÁTI ZS.[1], KECSKEMÉTI S.[1]*

[1]Department of Chemical Ecology, Plant Protection Institute, HUN-REN Centre for Agricultural Research

[2]Department of Plant Pathology, Plant Protection Institute, HUN-REN, Budapest, Hungary

FEEDING-RELATED OLFACTORY PREFERENCES OF *RHAGOLETIS COMPLETA*: RESPONSES TO WALNUT SPECIES AND FRUITS

The walnut husk fly *Rhagoletis completa* is an invasive pest increasingly affecting walnut orchards in Europe. To investigate feeding-related olfactory preferences, we tested the responses of newly emerged, unmated adults using a four-arm olfactometer. In two-choice assays, volatiles from two walnut species (*Juglans regia* and *J. nigra*) were each tested against a blank control. In separate trials, *J. regia*, *J. nigra*, and quince were similarly compared to the control. A third setup included ester-rich fruits (pear, quince, and melon), and a blank arm simultaneously. While attraction to walnut odours were weak and inconsistent, flies exhibited clear attractive behaviour toward the fruit odours, particularly quince. In the multi-choice setup, quince was preferred over both walnut species. These results suggest that ester-containing fruits elicit stronger foraging responses than the primary host plant, which may reflect the species' early adult nutritional needs and can inform attractant development for improved monitoring.

DOS SANTOS, M. R.[1,3], *MENEZES, T.* [1], *SANTOS, H. A*[2,3], *PEREIRA, C. M.*[1]
[1] *Chemistry Research Centre (CIQUP) and Institute of Molecular Sciences (IMS), Department of Chemistry and Biochemistry, Faculty of Sciences of University of Porto, Porto, Portugal*
[2] *Drug Research Program, Division of Pharmaceutical Chemistry and Technology, Faculty of Pharmacy, University of Helsinki, FI-00014 Helsinki, Finland*
[3] *University Medical Center Groningen, University of Groningen, Groningen, The Netherlands*

NANOSTRUCTURED LIPID CARRIERS AS AN ALTERNATIVE SYSTEM FOR CONTROLLED DRUG DELIVERY AND MYOCARDIAL INFARCTION TREATMENT

Cardiovascular diseases (CVDs) are the leading cause of death and disability globally, underscoring the need for innovative therapeutic solutions. Nanostructured lipid carriers (NLCs), combining solid and liquid lipids, offer advantages such as enhanced drug loading and controlled release. The aim was to enhance DDS performance and stability by strategically optimizing key formulation parameters, such as liquid lipid, solid lipid solubility and surfactant selection to achieve stable and monodisperse particle formation, leading to significant advancements in the overall efficacy of the systems. Among the tested lipids, tuna oil exhibited drug solubility (2.8 mg/mL), with Imwitor® 742 showing higher solubility (12.5 mg/mL). Precirol® ATO5 was identified as the optimal solid lipid, while PEG MW 1000 and soy lecithin had optimal surfactant properties. The CRV-NLC final formulation achieved a particle size of 121.1 nm, polydispersity index of 0.218, and zeta potential of -30.2mV.

RADAN, M. [1], *STASIŁOWICZ-KRZEMIEŃ, A.* [2], *CIELECKA-PIONTEK, J.* [2], *ŠAVIKIN, K.* [1]
[1]*Institute for Medicinal Plants Research "Dr. Josif Pančić", Tadeuša Košćuška 1, 11000, Belgrade, Serbia*
[2]*Dpt of Pharmacognosy and Biomaterials, Fac. Pharmacy, Poznan Univ. of Medical Sciences, Poznan, Poland*

DEVELOPMENT OF ANTHOCYANIN-LOADED ELECTROSPUN NANOFIBERS: NEW HORIZON FOR THE VALORIZATION OF CHOKEBERRY FRUIT WASTE

Recovering bioactive components from the chokeberry waste in the fruit-processing industry has attracted great attention in terms of minimizing the waste burden and providing a new source of valuable functional compounds. To develop new functional nanomaterials, ultrasound-assisted extraction was combined with electrospinning technology. The optimal conditions for maximizing the extraction of individual and total compounds were 45% ethanol concentration at 60 °C. By varying ratio of PVP, HP-β-CD, and HP-γ-CD four electrospun nanofibers loaded with the chokeberry waste extract were prepared. They were characterized with notable concentrations of cyanidin galactoside, glucoside, and arabinoside derivatives, and strong antioxidant potential. The FT-IR analysis confirmed conjugation between the carriers and bioactives, while the PAMPA assay suggested that anthocyanins likely cross the stomach cell membranes via active transport. Converting food waste into specifically tailored formulation holds a great potential to contribute to the consumers' nutrient and health benefits, while creating opportunities for integration into new value-added products.

CONTACTS

CONTACTS

First Name	Last Name	Email	Country
Helena	**Abreu**	helena@algalink.eu	Portugal (PT)
Nigar	**Alkan**	anigar@gmail.com	Türkiye (TR)
Eirini	**Anastasaki**	e.anastasaki@bpi.gr	Greece (EL)
STEFANOS	**ANDREADIS**	stefandreadis74@gmail.com	Greece (EL)
Conxita	**Avila**	conxita.avila@ub.edu	Spain (ES)
Anne-Geneviève	**Bagnères-Urbany**	ag.bagneres@cefe.cnrs.fr	France (FR)
Moe	**Bakhtiari**	moe.bakhtiari7@gmail.com	Switzerland (CH)
Mariana Rosado	**Barão**		Portugal (PT)
Eduardo Nuno	**Barata**	ebarata@uevora.pt	Portugal (PT)
Sylvie	**Baudino**	sylvie.baudino@univ-st-etienne.fr	France (FR)
Laura	**Bellec**	laura.bellec@univ-rennes.fr	France (FR)
Ayla	**Bilgin**	ayla.bilgin@gmail.com	Türkiye (TR)
James	**Blande**	james.blande@uef.fi	Finland (FI)
Thomas	**Blankers**	t.blankers@uva.nl	Netherlands (NL)
Atle Magnar	**Bones**	atle.m.bones@ntnu.no	Norway (NO)
Melike	**Bor**	bormelike@gmail.com	Türkiye (TR)
Sofia	**Branco**	sofbranco@hotmail.com	Portugal (PT)
Ivana	**Carev**	carev.ivana@gmail.com	Croatia (HR)
Aurelie	**Cartereau**	aurelie.cartereau@univ-tours.fr	France (FR)
Alberto Maria	**Cattaneo**	albertomaria.cattaneo@slu.se	Italie-Sweden (SE)
Levent	**Cavas**	levent_cavas@yahoo.com	Türkiye (TR)
Stefano	**Colazza**	stefano.colazza@unipa.it	Italy (IT)
Anne-Marie	**Cortesero**	Anne-Marie.Cortesero@univ-rennes1.f	France (FR)
Teun	**Dekker**	teun.dekker@slu.se	Sweden (SE)
Emmanouela	**Dermitzaki**	dermitzaki@vioryl.gr	Greece (EL)
Falko	**Drijfhout**	f.drijfhout@keele.ac.uk	United Kingdom (UK)
Andrea	**Ficke**	andrea.ficke@nibio.no	Norway (NO)
Marc	**Galland**	marc.galland@inrae.fr	France (FR)
Paolina	**Garbeva**	p.garbeva@nioo.knaw.nl	Netherlands (NL)
Helena	**Gaspar**	hmgaspar@fc.ul.pt	Portugal (PT)
CESAR	**GEMENO**	cesar.gemeno@icvv.es	Spain (ES)
David	**GIRON**	david.giron@univ-tours.fr	France (FR)
Malgorzata	**Grabarczyk**	malgorzata.grabarczyk@mail.umcs.pl	Poland (PL)
Martine	**Hossaert-McKey**	martine.hossaert@cefe.cnrs.fr	France (FR)
Deniz	**İnnal**	innald@gmail.com	Türkiye (TR)
Anna	**Jirošová**	jirosovaa@fld.czu.cz	Czech Republic (CZ)
Júlia Katalin	**Jósvai**	josvaijulia@gmail.com	Hungary (HU)
Apostolos	**Kapranas**	akapranas@agro.auth.gr	Greece (EL)
Katarina	**Karamanoli**	katkar@agro.auth.gr	Greece (EL)
Kaia	**Kask**	kaia.kask@emu.ee	Estonia (EE)
Güllü	**Kaymak**	gullu.kaymak@ksbu.edu.tr	Türkiye (TR)
Hasmik	**Khachatryan**	hasmikjasmin1@gmail.com	Armenia (AM)
ELENI	**Koutsogeorgiou**	eikoutso@agro.auth.gr	Greece (EL)
Veaceslav	**Kulciţki**	kulcitki@yahoo.com	Moldova (MD)
Serena	**Leone**	serena.leone@szn.it	Italy (IT)

First Name	Last Name	Email	Country
Ene	**Leppik**	ene@agriodor.com	France (FR)
Julie	**Maguire**	jmaguire@bmrs.ie	Ireland (IE)
Vida	**Malinauskiene**	vida.malinauskiene@ktu.lt	Lithuania (LT)
Faysal-Al	**Mamun**	faisal.oni111@gmail.com	Estonia (EE)
Ines	**Mandic Mulec**	ines.mandicmulec@bf.uni-lj.si	Slovenia (SI)
Luna	**Maslov Bandić**	lmaslov@agr.hr	Croatia (HR)
Radoslava	**Matusova**	Radka.Matusova@savba.sk	Slovakia (SK)
Thacilla	**Menezes**	thacilla.menezes@fc.up.pt	Portugal (PT)
Antonios	**Michaelakis**	a.michaelakis@bpi.gr	Greece (EL)
Victoria	**Moris**	victoria.carla.moris@gmail.com	Belgium (BE)
Nicolas	**Navrot**	nicolas.navrot@ibmp-cnrs.unistra	France (FR)
Danillo	**Oliveira de Alvarenga**	danillo.alvarenga@bio.ku.dk	Denmark (DK)
Maria	**Pappas**	mpappa@agro.duth.gr	Greece (EL)
Guy	**Polturak**	guy.polturak@mail.huji.ac.il	Israel (IL)
Carolina Maria	**Popa**		Portugal (PT)
Soizic	**Prado**	sprado@mnhn.fr	France (FR)
Andrea	**Prófumo Escribano**	aprofumo@ub.edu	Spain (ES)
Dejan	**Prvulović**	dejanp@polj.uns.ac.rs	Serbia (RS)
Vahideh	**RABANI**	rd@amiroy.com	France (FR)
Milica	**Radan**	milica.r994@live.com	Serbia (RS)
Sergio	**Rasmann**	sergio.rasmann@unine.ch	Switzerland (CH)
Miguel	**Rodrigues**	mvrodrigues@itqb.unl.pt	Portugal (PT)
Christina C.	**Roggatz**	croggatz@uni-bremen.de	Germany (DE)
Giovanna	**Romano**	giovanna.romano@szn.it	Italy (IT)
Mayara	**Roncaglia dos Santos**	mayararoncaglia@gmail.com	Portugal (PT)
Dorian	**Rossi**	dorian.rossi@etu.unistra.fr	France (FR)
Kathrin	**Rousk**	kathrin.rousk@bio.ku.dk	Denmark (DK)
Guy	**Schleyer**	guy.schleyer@nioz.nl	Netherlands (NL)
Stefan	**Schulz**	stefan.schulz@tu-bs.de	Germany (DE)
Peter	**Schupp**	peter.schupp@uni-oldenburg.de	Germany (DE)
Henrik Toft	**Simonsen**	henrik.toft.simonsen@univ-st-eti	France (FR)
Younes	**Smani**	ysma@upo.es	Spain (ES)
Pavel	**Stopka**	pstopka@natur.cuni.cz	Czech Republic (CZ)
Jasmin	**Suljagić**	jasmin.suljagic@untz.ba	Bosnia and Herzegovina (BA)
Mersiha	**Suljkanovic**	mersiha.suljkanovic@untz.ba	Bosnia and Herzegovina (BA)
Magdolna	**Szelenyi**	szelenyim@gmail.com	Hungary (HU)
Peter	**Tóth**	petery@nextra.sk	Slovakia (SK)
Maryse	**Vanderplanck**	maryse.vanderplanck@cefe.cnrs.	France (FR)
Rita	**Ventura**	rventura@itqb.unl.pt	Portugal (PT)
François	**Verheggen**	fverheggen@uliege.be	Belgium (BE)
Ljubodrag	**Vujisic**	ljubaw@chem.bg.ac.rs	Serbia (RS)
Cecylia	**Wardak**	cecylia.wardak@mail.umcs.pl	Poland (PL)
Kárpáti	**Zsolt**	karpati.zsolt@atk.hu	Hungary (HU)
Alenka	**Žunič Kosi**	alenka.zunic-kosi@nib.si	Slovenia (SI)