

IEES PARIS
SCIENTIFIC DAYS

JS2024

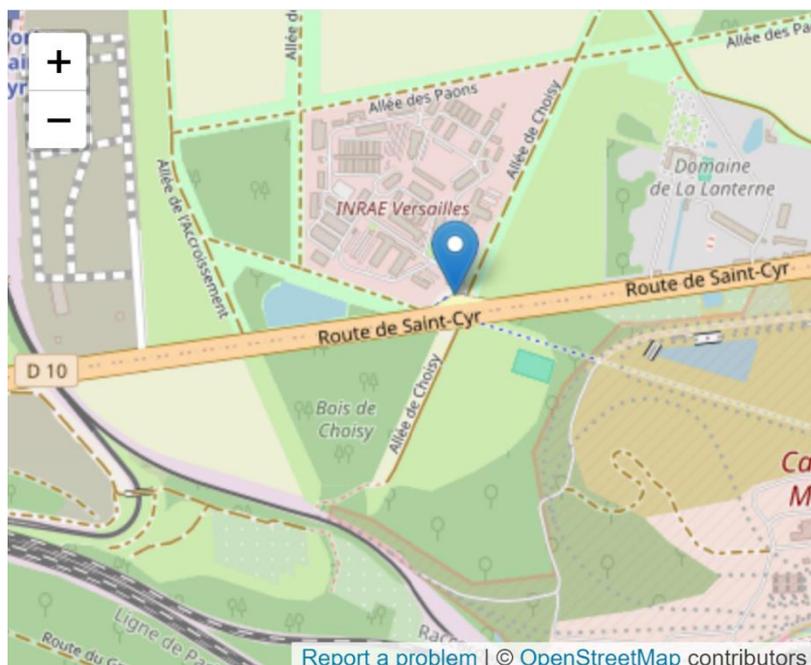


16 - 17
MAY

2024

VERSAILLES

EVENT LOCATION



- "Versailles - Chantiers " station (train C, N or U)
bus : 11, 40 or 44, "INRA" stop
- "Versailles - Château - Rive Gauche " station (train C)
bus : 11, 40, 44 or 401, "INRA" stop
- "Saint-Cyr" station (train C, N or U)
bus : 11, 40, 44 or 401, "INRA" stop
or 10 minutes walk

Amphitheater Jean Rebuschung, bâtiment 10 (SDAR).

Centre INRAE IdF Route de Saint Cyr,

78026 Versailles Cedex

<https://maps.app.goo.gl/pxJF7RDWsWxVTp586>

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Thibaud MONNIN

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Abhishek CHATTERJEE
Matthieu DACHER
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Nicolas MONTAGNÉ
Nicolas LOEUILLE
Séverine PLANCHAIS

Isabelle DAJOZ
Caroline FABRE
Jean-François LE GALLIARD
Tom VAN DOOREN
Naoise NUNAN

Logistic helpers

10h00	Opening				Chairs	Page
10h30	Welcome speech	Emma ROCHELLE-NEWALL	iEES Paris futur Director DR IRD	CoMiC - DCFE	Séverine PLANCHAIS	
10h35	Alteration of biodegradable and compostable plastics by biotic and abiotic factors	Melissa BAKHOS	PhD Student S-U	CoMiC - DCFE ; FEST - Sols-ZC		1
10h50	Does rhizospheric microbiome contribute to common bean tolerance to drought and tropospheric ozone ?	Charlotte DIANOUX	PhD Student UPEC	EcoPhyS - IPE		1
11h05	Posters					
11h50	What can mayflies tell us about origin of smell?	Sridevi BHAMIDIPATI	Post-doc INRAE	CRéA - ECOSENS	Naoise NUNAN	2
12h05	Harnessing large biodiversity databases to reveal recent changes in species distributions	Yoan FOURCADE	MC UPEC	BioDIS - DCFE		2
12h20	Fitness under high temperatures is overestimated when daily thermal fluctuation is ignored	Manuel MASSOT	CR CNRS	CRéA - ECOSENS		3
12h35	Ecological responses of squamate reptiles to nocturnal warming	Jean-François LE GALLIARD	DR CNRS	VPA - ECOEVO		3
12h50	Remote chemical command from the female to male clock induces and synchronises insect circadian rhythms	Abhishek CHATTERJEE	CR INRAE	NEO - ECOSENS		4
13h05	Lunch					
14h35	Patterns and processes of chemosensory genes evolution in the Drosophilidae	Amir YASSIN	CR CNRS	Evolution, genomes, behavior and ecology laboratory (EGCE)	Abhishek CHATTERJEE	4
15h20	Causal Predictors of Theoretical Maximum Yields across Europe	Ludovic HARTER	PhD Student S-U	EMS - DCFE		5
15h35	Posters					
16h20	Intraspecific variance and covariance of leaf and root functional traits during the restoration of <i>Bruguiera gymnorrhiza</i> in China	Shanshan SONG	Post-doc IRD	FEST - Sols-ZC	Jean- François LE GALLIARD	5
16h35	DEHP acts as an endocrine disrupting chemical in the pest moth <i>Spodoptera littoralis</i> and affects post-embryonic development, adult male sexual behaviour and offspring development	David SIAUSSAT	PU S-U	CRéA - ECOSENS		6

MAY 17

9h30	Opening				Chairs	Page
10h00	Cognition in a miniature Brain - Performance and Mechanisms	Martin GIURFA	Professor	Research Center on Animal Cognition (CRCA)	Isabelle DAJOZ	7
10h45	Deciphering chemical communication in an aquatic insect	Gabriela CABALLERO-VIDAL	Post-doc S-U	CRéA - ECOSENS		7
11h00	Posters					
11h45	Trophic cascades affect Priming Effect and the dynamics of dead organic matter : a theoretical approach	Romain THOMACHOT	PhD Student S-U	EERI - DCFE ; EMS - DCFE	Caroline FABRE	8
12h00	From Litter to Cast: Earthworm-Mediated Transformation of Sugars into Soil Organic Matter across Different Soils	Chao SONG	Post-doc IRD	FEST - Sols-ZC		8
12h15	Anticipation of the withdrawal of phytosanitary substances through the development of a distributed, generic and high-throughput chemical ecology infrastructure	Philippe LUCAS	DR INRAE	NEO - ECOSENS		9
12h30	Impact of different soil types (savannah, forest and tree-clump soils) and nitrogen fertilizer inputs on maize (Zea mays) yield and nitrogen nutrition under semi-natural "mesocosm" conditions	Fatoumata DRAME	PhD Student Univ. Nangui Abrogoua	EMS - DCFE		9
12H45	Evolution of pheromone receptors in insects	Nicolas MONTAGNÉ	MC S-U	CRéA - ECOSENS		10
13h00	Lunch					
14h30	Active and passive spatial flows of resources increase productivity in coupled ecosystems. An experimental test with a fish	Isabelle GOUNAND	CR CNRS	EERI - DCFE	Nicolas MONTAGNÉ	10
14h45	Seismic communication in courting <i>Drosophila</i> flies	Caroline FABRE	CDD Chercheuse INRAE, MSCA fellow	NEO - ECOSENS		11
15h00	Exploring the Relationship Between Earthworm Traits and Cast Composition: A Microcosm Approach	Yacouba ZI	PhD Student S-U	FEST - Sols-ZC		11
15h15	Navigating the unknown: unearthing novel ligands of insect odorant receptors through docking and electrophysiology	Arthur COMTE	PhD Student ABIES	CRéA - ECOSENS		12
15h30	Participatory snack, outdoor games (if the weather is nice, bring your games)					

<https://js-ieesparis.sciencesconf.org/>

#iEESJS

POSTERS

1	Wind erosion in Western Sahel: Quantifying the impact of land use and land management	Paul-Alain RAYNAL	PhD Student UPEC	F2ZC - Sols-ZC	15
2	Diet Acts on Detection of Female Sex Pheromones in a Male Moth	Evan FORCE	PhD Student Univ. Paris-Saclay	NEO - ECOSENS	15
3	TOS job!	Yoan MARCANGELI	AI CNRS	EMS - DCFE ; Plateau technique - Unité	16
4	Expression map of chemosensory genes in <i>Spodoptera frugiperda</i>	Abhinob BARUAH	PhD Student Univ. Paris Saclay	CRéA - ECOSENS	16
5	Drought effect on urban plane tree ecophysiology and its isoprene emissions	Ruben PUGA FREITAS	MC UPEC	EcoPhyS - IPE	17
6	Water stress characterization of <i>Arabidopsis thaliana</i> seedlings grown in controlled conditions	Philippe BIRON	IR S-U	FEST - Sols-ZC ; Plateau technique - Unité	17
7	Technical platform	Pierre FEDERICI	IE CNRS	ESEAE - ECOEVO	18
8	Exploring the microbial diversity of urban soils and its impact on the growth and survival of newly planted trees	Amandine HECQUET	PhD Student S-U	EMS - DCFE ; EERI - DCFE ; APCE - IPE	18
9	Using DNA from digestive contents to highlight the dietary diversity of an invasive alien species feeding on soil macrofauna	Mathis VENTURA	PhD Student UPEC	BioDIS - DCFE	19
10	Function and evolution of weevil pheromone receptors	Ludvine BRAJON	PhD Student Univ. Paris Saclay	CRéA - ECOSENS	19
11	Difference in termites' interactions with soil mercury depending on their feeding behavior and their microbiota	Michel DIOUF	MC UPEC	ESEAE - ECOEVO	20
12	Bioturbation and rice production in the Chrey Bak catchment in Cambodia	Sreyepich SINH	PhD Student UPEC, ITC	EcoPhyS - IPE ; FEST - Sols-ZC	20
13	Synthesis and optimization of a cellulose-based superabsorbent nanocomposite as water reservoir in agriculture	María Javiera GUARDA REYES	PhD Student S-U et Univ. de la Frontera	FEST - Sols-ZC	21

MARTIN GIURFA



Professor

Research Center on Animal
Cognition (CRCA)

University of Toulouse

“My research focuses on learning and memory at different organization levels, from behavior to molecules. I use 'bottom-up' and 'top-down' approaches and research tools from neurobiology, neuroethology, experimental psychology, computational neurosciences and molecular biology in order to understand the neuronal and molecular mechanisms underlying associative learning. The pluridisciplinary approach adopted in my research, which is also at the core of the institute I have founded in Toulouse, allows a better characterization of the cognitive richness of animals, in particular insects, and provides a multi-facetted view of cognition.”

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<https://www.iufrance.fr/les-membres-de-liuf/membre/917-martin-giurfa.html>

AMIR YASSIN



CNRS research fellow

Evolution, genomes, behavior
and ecology laboratory (EGCE)

IDEEV, University of Paris-Saclay

“My research focuses on the systematics and evolutionary genetics of flies in the family Drosophilidae. Drosophila melanogaster is undoubtedly a genetics star, but our understanding of the morphological and ecological diversity of non-melanogaster drosophilids remains nebulous. I attempt to establish a comprehensive phylogenetic classification of the family based on molecular and morphological data. I also combine population and functional genomics approaches to unravel the genetic basis of diverging phenotypes, such as female-limited color dimorphism, genital coevolution, host plant specialization and insular speciation.”

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<https://www.egce.universite-paris-saclay.fr/?p=11629&lang=en>



DIRECTION
 Director: MAÏBECHE Martine, PUS-U
 Assistant directors: FEDERICI Pierre, IE CNRS; GERBOUIN Frédéric, IR CNRS
 General administrator: ROUELLE-NEWALL Emma, DR IRD
 MONNIIN Thibaud, DR CNRS; MORA Philippe, PU UPEC

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ACCOUNTING AND SITE SECRETARIES	SITE SECRETARIES	INTERNE	EXTERNE
AZZI Johana, T CNRS BOITTE Nicolas, AI INRAE BOUCHEZ Michèle, T IRD BOUSQUET Carole, T S-U MARCIAI Véronique, T S-U OUAKI Laetitia, CDD T UPEC (50%)	GREKIS Efrossyni Fyvi, T UPEC IVANUS CHERFI Léna, CDD T IRD-ext	ANDRE Isabelle, IE CNRS (50%)	LEGOUPI Julie, IE CNRS

SCIENTIFIC DEPARTMENTS			
COMMUNITY DIVERSITY & ECOSYSTEM FUNCTIONING	EVOLUTIONARY ECOLOGY	SENSORY ECOLOGY	PLANTS-ENVIRONMENT INTERACTIONS
DCEFE	ECOEVO	ECOSENS	IPE
DUPONT Lise, MC UPEC et LATA Jean-Christophe, PU S-U <i>Biodis</i> BIOGEOGRAPHY AND DIVERSITY OF INTERACTIONS IN SOIL ROY Virginie, PU UPEC <i>ColMIC</i> MICROBIAL COMMUNITIES IN CONTINENTAL ECOSYSTEMS BARNY Marie-Anne, DR INRAE <i>EERI</i> ECOLOGY AND EVOLUTION OF INTERACTION WEBS MATHIEU Jérôme, MC S-U <i>EMS</i> INTEGRATIVE ECOLOGY: FROM MECHANISMS TO ECOSYSTEM SERVICES RAYNAUD Xavier, MC S-U	FRANTZ Adrien, MC S-U <i>EPE</i> EVOLUTIONARY ECO-PHYSIOLOGY DEBARRE Florence, DR CNRS <i>ESEAE</i> SOCIAL SPECIES IN THEIR ENVIRONMENTS: ADAPTATION AND EVOLUTION MOLET Mathieu, PU S-U <i>VPA</i> PHENOTYPIC VARIABILITY AND ADAPTATION VAN DOOREN Tom, CR CNRS	JACQUIN-JOLY Emmanuelle DR INRAE <i>CREA</i> CHEMO-RECEPTION AND ADAPTATION SIAUSSAT David, PU S-U <i>NEO</i> NEURO-ETHOLOGY OF OLFACTION LUCAS Philippe, DR INRAE MOLET Mathieu, PU S-U <i>VPA</i> PHENOTYPIC VARIABILITY AND ADAPTATION VAN DOOREN Tom, CR CNRS	REPELLIN Anne, PU UPEC <i>APCE</i> PLANTS ADAPTATION TO THE PLANTS ON STRESS SAVOURE Arnaud, PU S-U <i>ECOPHYS</i> MOLECULAR ECOPHYSIOLOGY ENVIRONMENTAL STRENGTH LEYMARIE Juliette, PU UPEC
SOILS IN THE CRITICAL ZONE	SOILS_ ZC		

TECHNICAL FACILITIES			
Pierre FEDERICI, IE CNRS			
ISOTOPIC BIO-GEO-CHEMISTRY	ECOGEOCHEMISTRY	MOLECULAR ECOLOGY	SOIL PHYSICS
BIRON Philippe, IR-S-U (50%)	MARCANGELI Yoan, AI CNRS (50%)	CANTO Pierre-Yves, AI CNRS (50%)	GUEYE Marmadou, IE IRD (50%)
INORGANIC ISOTOPIY	INSTRUMENTATION		
xx	LEMAIRE Baptiste, AI CNRS (50%)		

TRANSVERSE MISSIONS	
IT MANAGERS	INRAE Versailles (78) GEVAR Jérémy, IE INRAE LUCAS Philippe, DR INRAE MESLIN Camille, CR INRAE
PREVENTION & SAFETY	INRAE Versailles (78) SURAY Caroline, T INRAE IRD Bondy (93) GUEYE Marmadou, IE IRD UPEC Créteil (94) FRECHAULT Sophie, IE UPEC Thalonde GUERNIER Vanina, CR IRD
CONTINUING EDUCATION	CNRS GERBOUIN Frédéric, IR CNRS
SUSTAINABLE DEVELOPMENT	INRAE Versailles (78) MONSEMPES Christelle, IE INRAE GENET Patricia, MC Univ. Paris Cité
QUALITY, METROLOGY	INRAE Versailles (78) MONSEMPES Christelle, IE INRAE FRANCOIS Marie-Christine, T INRAE
INAGOGA PROTOCOL	COREGAL - EQUALITY M / W BULTELLE Angélique, T IRD BOUET Christel, CR IRD CRILAT Emilie, T S-U
OPEN SCIENCE	ACADEMIC DIRECTION DAJOZ Isabelle, PU Paris Cité MATHIEU Jérôme, MC S-U MESLIN Camille, CR INRAE ZAISS Rainer, IE IRD
URBAN CLIMATE CHANGE RESEARCH NETWORK	CARS MANAGEMENT S-U P&M Corré (75) FACTEAU Chantal, DREM CNRS LEMAIRE Baptiste, AI CNRS

CENTRAL SERVICES: building & civil engineering, breeding/laundry, greenhouse

10h35 **Bakhos Melissa, PhD Student S-U**
CoMiC - DCFE ; FEST - Sols-ZC

Alteration of biodegradable and compostable plastics by biotic and abiotic factors

Bakhos melissa <melissa.bakhos@sorbonne-universite.fr> (1) (2), *Rumpel cornelia* <cornelia.rumpel@inrae.fr> (1), *Biron philippe* <philippe.biron@sorbonne-universite.fr> (1), *Felbacq axel* <axel.felbacq@sorbonne-universite.fr> (1), *Patureau dominique* <dominique.patureau@inrae.fr> (3), *Lagarde fabienne* <fabienne.lagarde@univ-lemans.fr> (4), *Glais margaux* <margaux.glais@ct-ipc.com> (4) (5), *Dignac marie-France* <marie-france.dignac@inrae.fr> (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France), 2 - Agence de l'Environnement et de la Maîtrise de l'Energie (France), 3 - Laboratoire de Biotechnologie de l'Environnement [Narbonne] (France), 4 - Institut des Molécules et Matériaux du Mans (France), 5 - Centre Technique Industriel de la Plasturgie et des Composites (France)

The use of biodegradable and compostable plastics in packaging aims to address environmental concerns associated with single-use plastics, but their fate under environmental conditions was little studied. The objective of our study is to investigate the physical and chemical changes occurring when these materials are subjected to composting and UV ageing processes. We focused on two biodegradable films (PBAT, ethyl cellulose) and compared them to conventional polyethylene films. Our results revealed chemical changes via FTIR and pyrolysis-GC/MS and partial degradation, which is specific to the plastic type.

10h50 **Dianoux Charlotte, PhD Student UPEC**
EcoPhyS - IPE

Does rhizospheric microbiome contribute to common bean tolerance to drought and tropospheric ozone ?

Dianoux charlotte <charlotte.dianoux@u-pec.fr> (1), *Bastelica manami* <manami.bastelica@gmail.com> (1), *El Mazlouzi mohamed* <mohamed.el-mazlouzi@u-pec.fr> (1), *Have marien* <marien.have@u-pec.fr> (1), *Marmagne anne* <anne.marmagne@inrae.fr> (2), *Leitao luis* <luis.leitao@u-pec.fr> (1), *Leymarie juliette* <juliette.leymarie@u-pec.fr> (1), *Repellin anne* <repellin@u-pec.fr> (1), *Puga-Freitas ruben* <ruben.puga-freitas@u-pec.fr> (1)

1 - Université Paris-Est Créteil Val-de-Marne - Faculté des sciences et technologie (France), 2 - Institut Jean-Pierre Bourgin (France)

Drought and elevated tropospheric ozone episodes are expected to be more frequent and severe in the near future. Both are threats to crop yield and food security. In experiments conducted in 2023, two common bean genotypes differing in their sensitivity to ozone, were grown on a natural soil and subjected to drought, elevated ozone or the combination of both stresses, during the seed filling stage. We wondered if the physiological and yield discrepancies between the genotypes were related to their N use efficiency and/or to the structures of their respective rhizospheric microbial communities.

11h50

Sridevi Bhamidipati, Post-doc INRAE

CReA - ECOSENS

What can mayflies tell us about origin of smell?

Sridevi bhamidipati <sridevi.bhamidipati@inrae.fr> (1), *Thrimawithana amali* (2), *Buckley thomas R.* (3) (4), *Jordan melissa D.* (2), *Newcomb richard D.* (2) (3)

1 - Institute of Ecology and Environmental Sciences of Paris (France), 2 - The New Zealand Institute for Plant & Food Research Limited [Auckland] (Nouvelle-Zélande), 3 - University of Auckland [Auckland] (Nouvelle-Zélande), 4 - Manaaki Whenua " Landcare Research [Auckland] (Nouvelle-Zélande)

The transition of arthropods from an aquatic to a terrestrial lifestyle and then into the air imposed new challenges for their chemosensory systems. The nature of the early OR-based sensing systems in basal-winged insects remains unclear, with groups such as mayflies being largely overlooked for study. Next-generation sequencing techniques, antennal ultrastructure analysis, and molecular & functional characterization were undertaken to investigate the role of olfaction in NZ endemic mayfly, *Coloburiscus humeralis*. Overall, results suggest that this mayfly uses olfaction across its three different life stages.

12h05

Fourcade Yoan, MC UPEC

BioDIS - DCFE

Harnessing large biodiversity databases to reveal recent changes in species distributions

Fourcade yoan <yoan.fourcade@u-pec.fr> (1), *Lajeunesse armelle* (1), *Deleau susie* (1), *Louis-Honoré marie* (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France)

Changes in community composition and species distribution in response to global changes have often been revealed thanks to long-term surveys of charismatic animal species. Here, we show that unstructured occurrence data contained in global biodiversity databases can be used to unearth the patterns of biodiversity restructuring that occurred recently in response to human activity, especially - " but not limited to " climate change. This opens new opportunities for global change research on taxonomic groups that have received little attention so far.

12h20

Massot Manuel, CR CNRS

CReA - ECOSENS

Fitness under high temperatures is overestimated when daily thermal fluctuation is ignored

Massot manuel <manuel.massot@sorbonne-universite.fr> (1), Bagni thibaut <thibaut.bagni@gmail.com>

1 - Institute of Ecology and Environmental Sciences of Paris (France)

Most laboratory studies are carried out under constant temperatures and assume a negligible effect from daily fluctuating temperatures. We tested this assumption on fitness of the moth *Spodoptera littoralis*, and a literature review on insects complements this study. Fitness of *S. littoralis* at high temperature was lower under fluctuating temperatures than under constant temperature. Our review also shows that using constant temperature commonly leads to overestimate fitness at high temperatures.

12h35

Le Galliard Jean-François, DR CNRS

VPA - ECOEVO

Ecological responses of squamate reptiles to nocturnal warming

Le Galliard Jean-François <galliard@biologie.ens.fr> (1) (2)

1 - Institute of Ecology and Environmental Sciences of Paris (France), 2 - Centre de Recherche en Ecologie Expérimentale et Prédictive (77431 St Pierre les Nemours France)

Nocturnal temperatures are increasing at a pace exceeding diurnal temperatures in most parts of the world. Yet, the role of warmer nocturnal temperatures in animal ecophysiology has received scant attention and most studies focus on diurnal or daily descriptors of the temporal trends of the thermal environment to draw their conclusions. Here, I will illustrate the complex effects of nocturnal warming on squamate reptiles, a keystone group of vertebrate ectotherms, using qualitative and quantitative reviews as well as a energetic model of ectotherm foraging.

12h50

Chatterjee Abhishek, CR INRAE

NEO - ECOSENS

Remote chemical command from the female to male clock induces and synchronises insect circadian rhythms

Ghosh sagnik, Suray caroline, Chatterjee abhishek <abhishek.chatterjee@inrae.fr> (1)

1 - Institute of ecology and environmental sciences - Paris (France)

Sociosexual interactions with the opposite sex are universal, prevalent even in the lives of solitary animals - presenting a prototype to assess the impact of elemental social interactions on the circadian clock that dictates the daily time of behavioural activity. We employed male *Spodoptera littoralis* moth as our model, leveraging its adult life singularly dedicated to sex, and hence providing an ideal context to explore the impact of sociosexual cues on the circadian clock. We reveal surprisingly strong influence of pheromone-mediated sociosexual interactions on the circadian rhythms of a solitary insect.

14h35

Guest, Yassin Amir, CNRS research fellow

Evolution, genomes, behavior and ecology laboratory (EGCE)

Patterns and processes of chemosensory genes evolution in the Drosophilidae

Yassin amir <amir.yassin@universite-paris-saclay.fr> (1)

1 - Evolution, génomes, comportement et écologie (France)

Chemosensory genes rapidly evolve but the driving forces remain unclear. I present here our current projects in multiple *Drosophila* species. These projects reveal roles of receptors variation in eliciting avoidance against a toxin, driving the convergent specialization on a toxic fruit, maintaining a sexual mimicry syndrome, and underlying a major transition in a species that became a kleptoparasite inquiline in honeybee nests. A full picture of sensory evolution in a clade can thus be drawn.

15h20

Harter Ludovic, PhD Student S-U

EMS - DCFE

Causal Predictors of Theoretical Maximum Yields across Europe

Harter Ludovic <ludovic.harter@ens.psl.eu> (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France)

The GRAFS approach can be used to describe nitrogen flows in agri-food systems. It is based on an empirical relationship which establishes a link between crop rotation-scale nitrogen yields and total nitrogen inputs following a hyperbolic shape, with a single parameter Y_{max} representing the theoretical maximum yield. Here, we aim to clarify the role of agro-pedo-climatic variables as drivers of the spatial variability of Y_{max} . This study lays the groundwork to enhance the predictive capacity of the GRAFS model within the context of climate change, changing agricultural practices and land use.

16h20

Song Shanshan, Post-doc IRD

FEST - Sols-ZC

Intraspecific variance and covariance of leaf and root functional traits during the restoration of *Bruguiera gymnorrhiza* in China

Song shanshan <songss20@mails.tsinghua.edu.cn> (1), Arnaud marie <m.arnaudd@gmail.com> (2), Rumpel cornelia <cornelia.rumpel@inrae.fr> (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France), 2 - Institute of Ecology and Environmental Sciences of Paris (France)

To examine the ontogenetic intraspecific variation of mangrove ecosystems, leaf and root morphological and chemical traits were measured at the early and late development stage of *Bruguiera gymnorrhiza* in Hainan province, China. The functional traits of *B. gymnorrhiza* at different development stages were separated by the coordinated root and leaf functional traits. Significantly positive relationships were found between several analogous leaf and root traits (leaf size and root diameter, specific leaf area and specific root length, leaf nitrogen content and root nitrogen content, leaf and root $\delta^{15}N$).

16h35

Siaussat David, PU S-U

CReA - ECOSENS

DEHP acts as an endocrine disrupting chemical in the pest moth *Spodoptera littoralis* and affects post-embryonic development, adult male sexual behaviour and offspring development

Siaussat david <david.siaussat@sorbonne-universite.fr> (1), Rivas johanna, Maria annick, Fuentes annabelle, Chertemps thomas

1 - Institute of Ecology and Environmental Sciences of Paris (France)

DEHP is a widely produced plasticiser found in the environment, in particular in sediments, soils and plants. Few studies have focussed on its effects on terrestrial insects. We used the leafworm *Spodoptera littoralis* to study the effects of DEHP on post-embryonic development, male sexual behaviour and offspring's development. Larvae were exposed to environmentally relevant concentrations and higher concentrations of DEHP via food. An integrative approach was used, combining post-embryonic and male sexual behaviour monitoring, ecdysteroid and DEHP titration, gene expression measurements and metabolomics.

10h00

Guest, Giurfa Martin, Professor

Research Center on Animal Cognition, CNRS – University of Toulouse,

Cognition in a miniature Brain - Performance and Mechanisms*Giurfa martin <martin.giurfa@sorbonne-universite.fr> (1)**1 - Research Center on Animal Cognition - University of Toulouse (France)*

Honeybees possess miniature brains but exhibit a sophisticated behavioral repertoire. Besides being useful models for the study of simple forms of associative learning (e.g. odor-sucrose and color-sucrose associations), bees have emerged as attractive organisms for the study of higher-order forms of learning, both in the visual and in the olfactory domains. In the last two decades, our work has revealed that these insects possess unsuspected cognitive capabilities, which surpass the acquisition of simple associations. Capacities such as categorization, selective attention, conceptual forms of learning, numerosity and non-linear discrimination have been documented in honey bees, thus raising the questions of the neural architectures mediating them and of the peculiarity of bees with respect to other invertebrates. Here I will discuss some of these findings and provide insights into their mechanistic bases, in an attempt to trace them down to specific circuits and neuromodulatory processes whenever this is possible. In doing this, I will highlight experimental challenges and suggest future directions for investigating the neurobiology of higher-order learning in insects, with the goal of uncovering basic neural architectures underlying cognitive processing.

10h45

Caballero-Vidal Gabriela, Post-doc S-U

CReA - ECOSENS

Deciphering chemical communication in an aquatic insect

Caballero-Vidal gabriela <gabriela.caballero@sorbonne-universite.fr>, Derrien sarah <sarah.derrien@agrocampus-ouest.fr>, Braun éléonore <eleonore.braun@sorbonne-universite.fr>, Palazzo antonio <antonio.palazzo12@gmail.com>, Maria annick <annick.maria@sorbonne-universite.fr> (1), Jager muriel, Manuel michaël (2), Gévar jérémy <Jeremy.Gevard@inra.fr>, Jaquin-Joly emmanuelle <emmanuelle.joly@inrae.fr>, Chertemps thomas <thomas.chertemps@sorbonne-universite.fr> (1), Montagné nicolas <nicolas.montagne@sorbonne-universite.fr>

1 - Institute of Ecology and Environmental Sciences of Paris (France), 2 - Institut de Biologie Paris Seine (Cassan, bâtiment A, étage 4, 7 quai Saint Bernard, 75 252 PARIS CEDEX France)

Chemical senses play a key role in the adaptation of species to their environment, especially in insects. Changes in the sensory equipment of insects that have evolved from a terrestrial to an aquatic environment have long aroused the curiosity of scientists, but the mechanisms of sensory perception have never been studied in aquatic insects. This project aims to address this question using a chemical ecology approach (physicochemical analyses, electrophysiology, behavior) in the diving beetle *Rhantus suturalis*, a common species in Western European ponds and an important predator of mosquito larvae.

11h45

Thomachot Romain, PhD Student S-U

EERI - DCFE ; EMS - DCFE

Trophic cascades affect Priming Effect and the dynamics of dead organic matter : a theoretical approach

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Priming Effect (PE), defined by enhanced decomposition of recalcitrant organic matter following labile organic matter addition, is key to understand decomposition processes. However, brown food webs, based on dead organic matter, have been generally ignored in studies focusing on PE. To investigate the effects of food web structure on PE, we developed a model linking the decomposition of a labile and a recalcitrant pool of organic matter to trophic interactions between organisms. Our results highlight strong cascading effects of the brown trophic chain on PE.

12h00

Song Chao, Post-doc IRD

FEST - Sols-ZC

From Litter to Cast: Earthworm-Mediated Transformation of Sugars into Soil Organic Matter across Different Soils

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Our study aimed to observe how different earthworm species affect the transformation of labile litter-derived carbon into mineral associated organic matter (MAOM) across two soil types. We traced the amount of OC in casts using ¹³C-labeled litter in the laboratory and analyzed OC transformation from plant to microbial material using hemicellulosic sugar assays. Our findings highlight the crucial role of earthworms in sugar transformation and MAOM formation, showing that these processes are influenced by soil type and species interactions, which in turn impact the source, composition, and fate of plant litter.

12h15

Lucas Philippe, DR INRAE

NEO - ECOSENS

Anticipation of the withdrawal of phytosanitary substances through the development of a distributed, generic and high-throughput chemical ecology infrastructure

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ARDECO is a distributed Chemical Ecology infrastructure aimed at developing new solutions for the biocontrol of crop pest insects. It includes 4 academic partners, 5 technical institutes and 3 private companies. It will identify the nature and conditions of use of naturally occurring volatile organic compounds that play a key role in the behavior of insect pests. It will equip the French scientific community with research platforms and direct and inverse chemical ecology methods and tools to accelerate the research, development and deployment of biocontrol solutions to reduce farmers' dependence on pesticides.

12h30

Drame Fatoumata, PhD Student Univ. Nangui

Abrogoua

EMS - DCFE

Impact of different soil types (savannah, forest and tree-clump soils) and nitrogen fertilizer inputs on maize (*Zea mays*) yield and nitrogen nutrition under semi-natural "mesocosm" conditions

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Maize production in Africa remains one of the lowest in the world, due to soil degradation and lack of nitrogen fertilization. The solution may consist in making the most of soil diversity. We thus assessed the impact of different soil types and mineral fertilizers on maize productivity. Two maize varieties were grown on three soil types (forest, grove and savannah) with different nitrification rates. In addition, different fertilizations combining ammonium, nitrate and phosphorus were applied to the savannah soil

12h45

Montagné Nicolas, MC S-U

CReA - ECOSENS

Evolution of pheromone receptors in insects

Montagné nicolas <nicolas.montagne@upmc.fr> (1) (2)

1 - Institute of ecology and environmental sciences - Paris (France), 2 - Institut universitaire de France (France)

Pheromones are chemical signals that allow animals of the same species to communicate. For this communication to be truly species-specific, the signals emitted and the mechanisms for detecting them must diversify rapidly. In the CReA team, we study the evolution of membrane receptors responsible for the detection of pheromones by insect antennae. Using various molecular biology and bioinformatics methods, we compare in closely related species i) the number of genes encoding these receptors, ii) their expression levels in the antennae and iii) their detection spectra, in order to retrace their evolutionary history.

14h30

Gounand Isabelle, CR CNRS

EERI - DCFE

Active and passive spatial flows of resources increase productivity in coupled ecosystems. An experimental test with a fish

Gounand isabelle <isabelle.gounand@sorbonne-universite.fr> (1), Agostini simon, Carmignac david, Danger michaël, Decencière beatriz, Fer ambroisine, Fiorini sarah, Cantin emilie, Guichard Frédéric, Marcangeli yoan, Millot alexis, Astruc lilou, Puppo carine, Peller tianna, Bourge mickaël, Thebault elisa, Lacroix gérard

1 - Institute of Ecology and Environmental Sciences of Paris (France)

Basal species can be limited by different elements in different ecosystems. If spatial flows from close habitats bring those elements, we expect them to enhance productivity at local and regional scales via spatial complementarity. Moreover, animals may transfer nutrients in a more labile form increase this positive effect further. We tested these hypotheses in a meta-ecosystem experiment with a fish. We manipulated the presence and nature of spatial flows (top consumer excretion vs detritus flow) connecting ecosystems. Our results stress the importance of accounting for flow quality in addition to flow quantity.

14h45

Fabre Caroline, CDD Chercheuse INRAE, MSCA
fellow
NEO - ECOSENS

Seismic communication in courting *Drosophila* flies

Fabre caroline <caroline.fabre@inrae.fr> (1)

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Seismic signals are one of the most ancient and taxonomically widespread communication signals among animal species. They are displayed by species as varied as elephants, red-eyed tree frogs and Salticid spiders, to cite a few. I am studying this mode of communication in *Drosophila* where it is important for reproduction. I will present our findings on the signal's propagation in natural substrates where flies feed and court and how *Drosophila* females' leg sensory structures detect the substrate-borne signals. I will also show you divergences of this mode of communication in *Drosophila* species, including pests.

15h00

Zi Yacouba, PhD Student S-U
FEST - Sols-ZC

Exploring the Relationship Between Earthworm Traits and Cast Composition: A Microcosm Approach

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Earthworms modify soil functioning via casting production activities. We examined 9 earthworm species. We explored the impact of adding behavioral and physiological traits. we analyzed the links between the morpho-anatomical, physiological and behavioral traits and the physicochemical properties in casts. Results indicated significant differences among species. Earthworm species significantly modified all physicochemical parameters. Co-inertia analysis also indicated significant covariation between earthworm traits and casts properties and allowed to identify 9 traits that are the most influential.

Navigating the unknown: unearthing novel ligands of insect odorant receptors through docking and electrophysiology

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Odorant receptors (ORs) in insects are essential for a multitude of behaviors vital to their existence. Nevertheless, we have yet to unravel the identities of the ligands detected by the vast majority of ORs. To remedy this, we present a pioneering workflow based on a structure-based approach that combined docking and electrophysiology. Our method boasts the ability to predict novel ligands for both broadly tuned and specific ORs with great efficacy. This approach reveals unexplored regions within the chemical space detected by these proteins, thus addressing a longstanding gap in conventional experimentations.

1 Raynal Paul-Alain, PhD Student UPEC F2ZC - Sols-ZC

Wind erosion in Western Sahel: Quantifying the impact of land use and land management.

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In the Sahel, rainfed agriculture plays a crucial role in the livelihood of its rapidly growing population. Land degradation is a serious concern and wind erosion can deplete the soil of nutrients, especially in croplands.

In this study, we combined in situ measurements from Sahelian Senegal with a modelling approach to estimate the effect of the main Sahelian land uses and managements on wind erosion.

We then used our model to simulate the horizontal flux of sediments for the 1960 €“2020 period over a typical plot from the study area, for different realistic scenarios of land uses and land management.

2 Force Evan, PhD Student Univ. Paris-Saclay NEO - ECOSENS

Diet Acts on Detection of Female Sex Pheromones in a Male Moth

Force evan <forceevan6@gmail.com> (1), Monsempes christelle <christelle.monsempes@inrae.fr> (1), Dacher matthieu <matthieu.dacher@sorbonne-universite.fr> (1), Debernard stéphane <stephane.debernard@sorbonne-universite.fr> (1)

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In insects, sexual communication relies on males' attraction through species-specific odors emitted by females: sex pheromones. The latter are recognized by olfactory receptors located in membrane on olfactory receptor neurons. Pheromonal signal is integrated into olfactory centers, ultimately leading to sexual behavior. In male moth *Agrotis ipsilon*, sex pheromones detection leads to a behavioral response characterized by sex pheromones-triggered orientation flight. Knowing that male diet impacts the behavioral response in this species, we suggest that diet would also affect sex pheromones detection.

3

Marcangeli Yoan, AI CNRS

EMS - DCFE ; Plateau technique - Unité

TOS job!

Marcangeli yoan <yoan.marcangeli@sorbonne-universite.fr> (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France)

A touch of humor about the work of laboratory technicians.

4

Baruah Abhinob, PhD Student Univ. Paris Saclay

CReA - ECOSENS

Expression map of chemosensory genes in *Spodoptera frugiperda*

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Moths of the *Spodoptera* genus cause significant agricultural damage due to their ability to colonize many host plants, enabled by their perception of plant odors through chemosensory receptors. This study elucidated the taste chemosensory system in *Spodoptera frugiperda*, a world global pest, identifying 409 chemosensory genes in its genome and revealing differential expression patterns of those genes across life stages and tissues. This work provides a strong basis to study further the chemosensory system of this pest and choose potential target to develop biocontrol solutions.

Drought effect on urban plane tree ecophysiology and its isoprene emissions

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Trees emit a wide range of biogenic volatile organic compounds (bVOC) that can impact air quality. However, little is known about the contribution of urban trees to air quality, particularly during periods of drought. In a semi-controlled experiment, trees were subjected to drought and the morphology, physiology and bVOC emissions were comprehensively characterized. Together, these parameters provided relevant information on the relationship between bVOC emissions and plant morphology, water use efficiency and photosynthetic energy conversion.

Water stress characterization of *Arabidopsis thaliana* seedlings grown in controlled conditions

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1 - Institute of Ecology and Environmental Sciences of Paris (France)

In this poster we show the importance of combining simultaneous measurements of plants and soil parameters to characterize water stress in controlled conditions. Plants were grown in a confined controlled environment where plant pots mass, gas exchanges and thermal infra-red pictures of soil and leaves were recorded continuously. Leaf proline accumulation was used as an indicator of plants water stress. Our study can contribute to better understand mechanisms leading to drought tolerance

7

Fédérici Pierre, IE CNRS
ESEAE - ECOEVO

Technical platform

Federici pierre <pierre.federici@upmc.fr> (1)

1 - Institute of Ecology and Environmental Sciences of Paris (France)

Présentation of technical facilities.

8

Hecquet Amandine, PhD Student S-U
EMS - DCFE ; EERI - DCFE ; APCE - IPE

Exploring the microbial diversity of urban soils and its impact on the growth and survival of newly planted trees

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In the 70s, the concept of suppressive soil emerged in agriculture, suggesting that soils could contain beneficial microorganisms that can control plant pathogens with a positive effect on plant growth. Widely studied on crops, this concept remains poorly understood in urban environments. My project aims to better understand the links between microbial diversity, tree growth and physico-chemistry of urban soils. The results could guide soil management practices in urban environment and promote a better understanding of the importance of soil microorganisms in this environment.

Using DNA from digestive contents to highlight the dietary diversity of an invasive alien species feeding on soil macrofauna

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1 - Institute of Ecology and Environmental Sciences of Paris (France)

Obama nungara, which has recently invaded Europe and metropolitan France, is an invasive terrestrial flatworm mostly found in anthropized environments and known to feed on earthworms and gastropods, but field data are still missing. Impacts of its diet on indigenous biodiversity can then be carried out through metagenomic approaches, using high-throughput sequencing of DNA from digestive contents to reveal the diversity of earthworms consumed. We show here the first results from an ongoing study, and we discuss how soil ecosystems may be impacted by *O. nungara*'s predation on earthworms' ecotypes.

Function and evolution of weevil pheromone receptors

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Weevils constitute the Earth's largest animal family. These insects are adapted to a multitude of host plants, and some are serious pests. They use an aggregation pheromone to colonize their host plants, which is detected by pheromone receptors (PRs) expressed in sensory neurons of their antennae. Currently, only 6 PRs are known in 3 different weevil species: *Rhynchophorus ferrugineus*, *Rhynchophorus palmarum*, and *Ips typographus*. Surprisingly, some weevil PRs can detect VOCs from host plants in addition to pheromone compounds. This could be the starting point for improving integrated pest management solutions.

Difference in termites' interactions with soil mercury depending on their feeding behavior and their microbiota

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Mercury (Hg), especially its methylated form (MeHg) is of the most toxic trace elements, among the top ten chemicals of greatest concern for human and environmental health. It is still unclear how it impacts terrestrial animals, depending on species-specific biological traits. Here, Hg body content and microbial communities were compared between soil-feeding (SF) and wood-feeding (WF) termites from French Guiana. We found that SF had higher level of total Hg and MeHg in their body and a Hg-methylation potential compared to WF termites. Thus, the feeding habit of soil animals seems crucial in the response to Hg exposure.

Bioturbation and rice production in the Chrey Bak catchment in Cambodia

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In Cambodia, agriculture is a driver of economic growth and poverty reduction despite accelerating land degradation. This process is under tight scrutiny in the Chrey Bak catchment, a long-term observatory of the Institute of Technology of Cambodia. There, we analyzed the links between earthworm distribution, rice production and agricultural practices, in relation with land use. The results were used to conduct a thorough spatial analysis based on multiple indices (vegetation type, land cover, climate) to identify further links between bioturbation and rice production.

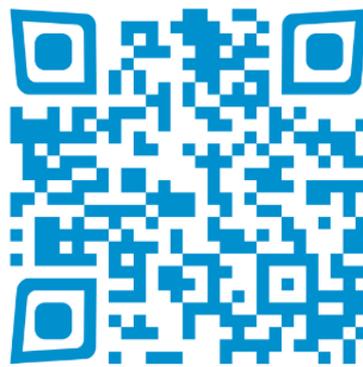
Synthesis and optimization of a cellulose-based superabsorbent nanocomposite as water reservoir in agriculture

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Effective water management in agriculture is essential to address drought. The limited availability of water inhibits the development of crops, worsening worries about food security under an expanding global population. Promising results are seen with the implementation of innovative approaches, such as the incorporation of hydroxyapatite nanoparticles into cellulose-based hydrogels. The synthesized nanoparticles were found to be suitable, leading to nanocomposites that showed enhanced viscoelasticity and water retention. This innovative approach offers an option to enhance soil quality under drought.

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Guests photos by guests



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