Scientific Days

Tuesday 30th September
and
Wednesday 1st October
2014

Versailles-Grignon Research Centre - Amphitheatre
**Tuesday 30th September**

- **9h30** Opening, coffee break - Rotonde

- **10h** Welcome
  - Luc ABBADIE
  - DCFE ENS, PD UPMC

- **10h05** Network-based approaches to the grand challenges of 21st century ecology
  - Guy WOODWARD
  - GUEST Dr. Reader in ecology

- **10h45** Application of a spectrofluorometric tool (Benthotorch) for the monitoring in rivers of benthic biofilms including potentially toxic cyanobacteria
  - Isidora ECHENIQUE
  - DCFE COM, PD UPMC

- **11h** Mosaic nature of intercastes and evolutionary implications in ants
  - Sylvain LONDE
  - ECOLE ENS, PD UPMC

- **11h15** The molecular basis of olfaction in the cotton leafworm: towards innovative approaches in plant protection
  - Arthur de FOUCHIER
  - ECOSENS CRE, PD UPMC

- **11h30** Stress as an indicator of habitat degradation
  - Remy JOSSEBAND
  - ECOLE ENS, PD UPMC

- **11h45** Could trace metals explain the higher frequency of darker pigeons in cities?
  - Marion CHATELAIN
  - ECOLE ENS, PD UPMC

- **12h** Odor guided behavior in the vinegar fly
  - Markus KNADEN
  - GUEST Dr

- **12h40** Lunch break - Cafeteria

- **13h** Coffee break, posters - Rotonde

- **13h30** So many actors in just one place: diversity and roles of biotransformation enzymes in insect antennae
  - Thomas CHEMETRANS
  - ECOSENS CRE, MC UPMC

- **14h** Community structure of soil organisms and impact on the functioning of forest ecosystems such as Eucalyptus plantations and cork oak forests of the region Aït-Mahmoud (Morocco)
  - Hana NABIL
  - SOLEAU DIM, PD UPEC

- **14h50** Neuronal coding of natural dynamics of odor stimulation in the moth brain
  - Vincent JACOB
  - ECOSENS CRE, PD UPMC

- **15h** Interactions between the green and brown food web determine ecosystem functioning
  - Kejun ZOU
  - DCFE ENS, PD UPMC

- **15h45** Intra-specific variation in mobility and light sensitivity in the Collembolan F. candida
  - Marra GALLARDO-RIUZ
  - ECOLE ENS, PD UPMC

- **16h** Coffee break, posters - Rotonde

- **16h30** Odor-mediated orientation and search strategies of walking and flying insects
  - Christopher WHEELER
  - ECOSENS CRE, PD UPMC

- **16h40** Competition with wind-pollinated plant species alters potential attractiveness to pollinators of insect-pollinated plant species
  - Floriane FLACHER
  - DCFE ENS, PD UPMC

- **16h55** Biological control against termite pest species
  - David SILLAM-DUSSES
  - SOLEAU DIM, MC PARIS XI

- **17h20** Medaka as an experimental model for studies in eco-evolutionary dynamics
  - Eric EDELINE
  - DCFE ENS, PD UPMC

- **17h45** Cocktail - Cafeteria

**Wednesday 1st October**

- **9h30** Opening, coffee break - Rotonde

- **10h00** Responses of the decomposer system in an Amazonian rainforest to shifts in resource C:N:P stoichiometry
  - Stephan HATTENSWILLER
  - GUEST Dr. Reader in ecology

- **10h10** Maize field odorscape and host plant colonization behaviour of the European Corn Borer
  - Ene LEPPIK
  - ECOSENS CRE, POSTDOC ANRALS

- **10h25** Impact of anaerobic bacterial activities on the dynamic and speciation of mercury in tropical soils in French Guiana
  - Mira TOUBASSY
  - SOLEAU DIM, PD UPEC

- **10h40** Green roofs: functioning and dynamic of related ecosystem services
  - Tann DUSZA
  - DCFE ENS, PD UPMC

- **10h55** Coffee break, posters - Rotonde

- **11h25** Evolutionary response of plant interaction traits to nutrient enrichment modifies the assemblage and structure of antagonistic-mutualistic communities
  - Emmanuel GEORGEKIN
  - DCFE ENS, PD UPMC

- **11h40** Magnesium isotope variations in forest ecosystem to assess dolomite-liming effect in a granitic catchment
  - Mélanie BOLOU-BI
  - SOLEAU DIM, PD UPEC

- **11h55** An Evo-Devo approach to assess the evolution of winglessness in ants
  - Adrien HENNIGE
  - ECOENS CRE, PD UPMC

- **12h00** Impact of a grass roots, earthworm activity and organic content on physical properties of a constructed Technosol
  - Maha DEEB
  - SOLEAU DIM, PD UPEC

- **12h25** Neighbouring landscape and land use shape the local functional diversity of soil fauna
  - Florence DUBS
  - SOLEAU DIM, ex-CDD IRD

- **12h40** The fungus-growing ants: from simple gardening to industrial farming (documentary feature)
  - Christian PEETERS
  - GUEST

- **12h55** Lunch break - Cafeteria

- **13h55** Coffee break, posters - Rotonde

- **14h25** Ecosystem services must tackle anthropized ecosystems and ecological engineering
  - Sébastien BOROT
  - DCFE ENS, PD UPMC

- **14h50** Reproductive system in the soil-feeding termite Embiratermes neotenicus (Termitidae, Syntermitinae)
  - Romain FOUGEROLLAS
  - SOLEAU DIM, PD UPMC

- **15h05** Exploring the structural and functional diversity of bacterial communities associated with bloom-forming cyanobacteria
  - Misael ZANCARINI
  - ECOSENS CRE, ATER UPMC

- **15h20** State-space models for inference and analysis of ecological processes: from evolution to ecosystem dynamics
  - Andrei LOPEZ-SEPULCRED
  - GUEST

- **15h45** Probing the odorscape: how insects use environmental olfactory information to guide their movements
  - Michel RENOU
  - ECOSENS CRE, PD UPMC

- **16h15** End of Scientific Days
These Scientific Days are the first of our Institute, created just nine months ago. They herald the real start of the dialogue between disciplines and issues at the heart of the IEES-Paris project. For each of us, it is the occasion to take stock of our own research and to identify opportunities for expanding our fields of interest in ecology and the environment. For this, we are open to all comments from our guests.

For the youngest of us, these Days are also a first insight into the international dimension of research, so important in building a career in science. Last but not least, these Days are also an opportunity to talk science and only science for two days, a luxury almost... So go ahead and do science!

Luc ABBADIE, PU UPMC, iEES Paris Director

In the following pages, complete affiliations are indicated only for non-members of IEES Paris

Network-based approaches to the grand challenges of 21st century ecology

Dr Guy WOODWARD (Faculty of Natural Sciences, Department of Life Sciences, Imperial College, England)

As we move deeper into the Anthropocene our natural ecosystems will come under increasing pressure from a cocktail of environmental stressors, yet the consequences for multispecies systems remain largely unknown. Ecological networks, such as food webs, provide a powerful means of bridging different organisational levels - from genes to ecosystems - and of linking structure to function, yet applied ecology has focused on the network nodes and largely ignored the links when considering stressor impacts. I will show how network-based approaches can provide new insights into biotic responses to climate change, acidification, and pesticides as examples, and will suggest how pure and applied ecology could be combined to help us cope with the emerging environmental challenges of the 21st Century.

Application of a spectrofluorimetric tool (Benthotorch) for the monitoring in rivers of benthic biofilms including potentially toxic cyanobacteria

Isidora ECHENIQUE-SUBIABRE (DCEC CONIC, PhD UPMC), Anouk ZANCARINI, Catherine QUILLERER (MNHN, UMR 7245 Molécules de Communication et Adaptation des Micro-organismes MCA) & Jean-François HUYBERT

Microbial benthic communities in rivers can be dominated by filamentous cyanobacteria but the environmental conditions that favour their development are still unknown. During the last years, numerous cases of animal poisoning due to cyanotoxins produced by benthic cyanobacterial (mainly Phormidium sp.) have been described worldwide, which requires the implementation of monitoring programs to limit sanitary risks for humans and animals.

Searching for field tools allowing a rapid estimation of the global composition and biofilms biomasses, we test performance of the Benthotorch, which allows quantification, per surface unit, of the biomasses of green algae, diatoms and cyanobacteria. This quantification is based on the relative fluorescence intensity of chlorophyll-a following sequential light excitation by diodes emitting at different wavelengths.

By the comparison of the results providing by the Benthotorch with those resulting with microscopic and spectrophotometric evaluation, our results indicated that the Benthotorch performed well at the early stages in the development of benthic communities, i.e. with biomasses <5µg eq. chl-a cm⁻². On the other hand, when cyanobacteria become dominant in the biofilm and when more important biomasses are reached, the efficiency of the Benthotorch declines.

This decrease in the efficiency of the Benthotorch when cyanobacteria are dominant might be explained by two hypotheses: (1) an overestimation of the diatom content, possibly because of their physical positioning in the biofilms and/or (2) an underestimation of Phormidium sp. due to its particular pigment composition, which requires another calibration of the tool. Works are in progress to test these two hypotheses.
The molecular basis of olfaction in the cotton leafworm: towards innovative approaches in plant protection

Arthur de FOUCHIER (ECOSENS CREA, PhD UPMC), Nicolas MONTAGNE, William WALKER*, Mattias C. LARSSON* & Emmanuelle JACQUIN-JOLY

SLU, Department of Plant Protection Biology, Sweden

Olfaction is vital for insects and Olfactory receptors (ORs) are key elements in this process. As such, they are a focus of research, both for fundamental knowledge of sensory systems and for their potential as novel targets to control behaviors of crop pests and disease vectors. In this context, we have functionally characterized 35 ORs of the moth Spodoptera littoralis, a polyphagous pest, to get a better understanding of how this species uses its odor space and we identified target receptors for the design of “bio-olfacticides”.

Mosaic nature of intercastes and evolutionary implications in ants

Sylvain LONDE (ECOEVO EPE, PhD UPPMC), Thibaud MONNIN & Mathieu MOLET

Ants occasionally produce intercastes that are mosaics of queen and worker traits. Because of their rarity, intercastes have been little studied. However, they may be involved in the evolution of novel castes. In order to test this hypothesis, we investigated intercaste behaviors and their phenotypes. We found that intercastes have a high reproductive potential and support the hypothesis that they may be at the origin of novel castes.

Stress as an indicator of habitat degradation

Rémy JOSserAND (ECOEVO EPE, PhD UPPMC), Sandrine PEYLAN, Jean-François LE GALLIARD & Yann VOITURON (CNRS, UMR 5023 Laboratoire d’écologie des hydrosystèmes naturels et anthropisés LEHNA)

As part of overall changes taking place for several decades, organisms must adapt to changes in their environment. The theory expected that organizations put in place plastic responses to deal with these unpredictable changes. In this context, the allostasis model proposed by McEwen and Wingfield in 2003 is a good base of discussion in Physiology of Conservation and allows making link between the environment and the response developed by organisms following a perturbation via glucocorticoids.

Could trace metals explain the higher frequency of darker pigeons in cities?

Marion CHATELAIN (ECOEVO EPE, PhD UPPMC), Adrien FRANTZ & Julien GASPARINI

Understanding the effects of trace metals emissions by anthropogenic activities on wildlife is of great concern in urban ecology but we still have little information on how they affect organisms, populations and ecosystems. Among other things, trace metals could be involved in melanin-based plumage colouration polymorphism maintenance. We investigated these questions in the feral pigeon (Columba livia) which is both a typical urban bird and exhibits various melanin-based plumage colouration.

Odor guided behavior in the vinegar fly

Dr. Markus KNADEN (Department of Evolutionary Neuroethology, Odor-guided behavior, Max Planck Institute for Chemical Ecology, Germany)

The vinegar fly Drosophila melanogaster uses olfaction to target food and oviposition sites. Individual odorants have been identified that either attract or repel these flies. Here I present current work on:

a. Whether one can predict the valence of a binary mixture based on the valences of the individual mixture components.

b. A specific key odorant that is extremely repellent and helps flies to avoid parasitoid wasps.

So many actors in just one place: diversity and roles of biotransformation enzymes in insect antennae

Thomas CHERTEMPS (ECOSENS CREA, MC UPMC), Marie-Anne POTIER, Nicolas DURAND, David SIAUSSAT & Martine MAIBECHE

Insects use mainly chemical cues to perceive various environmental signals and subsequently respond with the most appropriate behavior. The detection of odorants occurs in antennae, and huge progress has been made in the understanding of the molecular and cellular basis of olfactory signal processing. But recently, novel high throughput approaches revealed an unsuspected diversity of biotransformation enzymes in this organ supposed to be dedicated to olfaction, whose roles remains to be discovered…
14h55 Hana NABIL

Community structure of soil organisms and impact on the functioning of forest ecosystems such as Eucalyptus plantations and cork oak forests of the region Mâamora (Morocco)

Hana NABIL (SOL&EAU DIIM, PhD UPEC Maroc) Corinne ROULAND LEVEYRE, Marie DOUZ & Mohamed ARAROU (Institut Scientifique, Maroc)

Industrial plantations of fast-growing trees have been widely developed in the tropics, but the conservation of soil fertility in a sustainable way requires an appropriate management. Thus, Eucalyptus from Australia, have been important introductions throughout the Mediterranean especially in Morocco, Spain, Tunisia and Algeria. In Morocco, the first plantations of Eucalyptus performance date from the 20s, they were planted in swampy coastal areas to clean up the environment, but they have gradually extended to afforestation on areas previously occupied by cork oaks less profitable. Despite the socio-economic importance of this operation, soil depletion associated with this culture, water loss is likely to worsen with global warming and the desire to recreate areas of natural vegetation has led in recent years, the Moroccan government to promote policies of reconstruction of ancient ecosystems planted cork oaks. However, in areas that have been used for many years as Eucalyptus, replanting of cork oaks proved inefficient in contrast to those made on ancient cork forests. Our work are intended to compare the biological functioning of soils in these forest ecosystems, the cork oak forests and Eucalyptus plantations, grown on the same soil and under the same weather conditions to determine why cork oaks are enable to grow on soil under Eucalyptus and determine impact of reforestation on soil fauna and ecosystem services.

Density, biomass and diversity of soil macrofauna were compared in plots of cork oaks (native forest) and Eucalyptus (plantation). The first results obtained shown a clear influence of reforestation with Eucalyptus on the structure, distribution and community diversity of soil macrofauna.

15h10 Vincent JACOB

Neuronal coding of natural dynamics of odor stimulation in the moth brain

Vincent JACOB (ECOSEING NEO, POSTDOC INRA), Jean-Baptiste MASSON (CNRS, UMA 2171 Physics of Biological Systems, Institut Pasteur), Jean-Pierre ROPINS & Philippe LUCAS

Understanding how olfactory information is encoded as neuronal activity in the brain is crucial to elucidate insect behavioral strategies. Olfactory plumes are turbulenty transported in the air resulting in an intermittent and irregular olfactory signal. We applied simple or random sequences of pheromonal stimulation to generate a prediction of antennal lobe response to any signal varying in time. The prediction was tested by comparison with neuronal responses to natural sequences of stimulation.

15h25 Kejun ZOU

Interactions between the green and brown food web determine ecosystem functioning

Kejun ZOU (DCFE EERI, PhD UPMC), Elsa THEBAULT, Gérard LACROIX & Sébastien BAROT

Classical food web theory has focused either on green food webs or on brown food webs and generally ignored nutrient cycling. We argue that nutrient cycling connects the two and questions the concept of top-down and bottom-up controls. By constructing simple models, we demonstrate that the trophic cascades in one food web can affect the production of the other food web. The signs of these effects depend on: 1) the relative proportion of direct/indirect nutrient cycling by decomposers and their predators; 2) the mutualistic/competitive relation between primary producers and decomposers.

15h40 Marta GALLARDO-ROJAS

Intra-specific variation in mobility and light sensitivity in the Collembolan F. candida

Marta GALLARDO-ROJAS (ECCOLO VPA, PhD UPM), Thomas TULLY & Jean-François LE GALLARD

Dispersal is a complex syndrome that includes correlated behavioural, morphological and life history traits (RONCE & CLOBERT 2012). Thus, the goal of my research is to bring more light on the integration between dispersal and classical life-history traits by studying intra-specific variation in locomotor behaviour and activity patterns, including genetic variation and plasticity as well as covariation with life history. To this end, I perform microcosm experiments where I photo-track the displacement of Folomia candida (MALLARD et al 2013), a parthenogenetic Collembolan species, relying on a source population of 12 different clonal lineages that can be positioned along a slow-fast life-history gradient (Tully et al 2006; TULLY & FERNIERE 2008). Here, I will present preliminary results from automated image analyses and behavioural studies tracking movements of individual collemboles and their light sensitivity. Although F. candida is a soil-dwelling eye-less species living in the litter or in caves, available literature on its sensitivity to light and movement patterns is scarce and sometimes contradictory (FOX et al 2007; AUCLERC et al 2010).

16h40 Floriane FLACHER

Competition with wind-pollinated plant species alters potential attractiveness to pollinators of insect-pollinated plant species

Floriane FLACHER (DCFE EERI, PhD UPMC), Xavier BAYAUD, Améline HANSART (CNRS, UMS 3116 Ecotron de-france CEREFP), Eric MOURAT & Isabelle DAJOZ

We studied the competitive interactions between wind-pollinated and insect-pollinated plant species in order to determine whether these interactions could alter the attractiveness of the insect-pollinated plant species.

To address this question we carried out a greenhouse pot experiment, in which three insect-pollinated plant species were grown in binary mixtures with four wind-pollinated plant species. The wind-pollinated plants (Holcus lanatus, Plantago lanceolata, Agrostis capillaris and Chenopodium album) were chosen on the basis of differences in their sensitivity to light and their competitive ability to take up soil nutrients.

Overall, the presence of wind-pollinated species affected several attractiveness traits of insect-pollinated species (e.g., flower number, size, and nectar sugar content) and that attractiveness was decreased with increasing competition. To our knowledge, this is the first study that has investigated how the presence of wind-pollinated plant species alters the production of rewards in insect-pollinated plant species. Such modifications might influence pollinator behavior and, ultimately, the pollination service. This stresses the importance of studying the whole plant community (i.e. insect-pollinated and all other species) when focusing on plant-pollinator interactions. This is of great importance in the context of plant-pollinator decline and threats to the pollination service.
Biological control against termite pest species

David SILLAM-DUSSES (SOL&EAU DIIM, MC PARIS XIII, IRD) & Mireille VASSEUR-COGNET

Although termites have a role primarily beneficial in the wild, about 200 species are known to be pest species by damaging human constructions in urban areas and agricultural and forest resources in cultivated areas. Our research project is to use synthetic trail pheromone of pest termites confined in places of infestation to attract them to traps containing food impregnated with RNAi to inhibit the expression of a sex and caste-specific transcription factor related to glucido-lipid metabolism.

Medaka as an experimental model for studies in eco-evolutionary dynamics

Eric EDELINE (DCFE EERI, MC UPMC)

A growing number of studies demonstrate that evolutionary trait changes can be fast enough to affect the outcome of ecological interactions. In turn, ecological changes may alter natural selection on traits, potentially giving rise to feedback loops between evolutionary and ecological dynamics. Integration of these so-called eco-evolutionary dynamics in our understanding of the processes that shape and maintain biodiversity now represents a major frontier for biology. Here, we present our ongoing experiments using the medaka as a model to investigate eco-evolutionary dynamics acting on body size and correlated traits. Our approaches are based on size-dependent harvesting of medaka populations, in parallel in the laboratory and in outdoor pond ecosystems. Experiments are performed on populations originating from wild medaka sampled in Toyohashi, Japan. The results we have obtained so far show that body size is a primary driver of medaka predatory capacities, which has cascading effects in the ecosystem. Additionally, we found that selective harvesting of large individuals strongly affects medaka population dynamics, probably by altering negative density-dependent interactions between juveniles and adults. We are currently starting experiments aiming at measuring life-history, behavioral and candidate-gene responses to size-dependent selection in the laboratory. In the future, selected laboratory lines will be used to investigate potential eco-evolutionary feedback loops acting on medaka body size in pond ecosystems.

Responses of the decomposer system in an Amazonian rainforest to shifts in resource C:N:P stoichiometry

Dr Stephan HATTENSCHWILER (CEFE/CNRS, UMR 5175 Centre d'écologie fonctionnelle & évolutive CEFE, Département écologie fonctionnelle, Montpellier)

Coastal tropical rainforests of the Amazon grow on some of the oldest and most nutrient impoverished soils on Earth. With a series of field and laboratory experiments we assessed how the relative availability of the key elements C, N, and P control heterotrophic organisms in the litter-soil interface of a rainforest in French Guiana. Our data suggest complex stoichiometric control with P playing a key role. Shifts in the stoichiometry of available resources alter microbial functioning that can lead to rapid and strong changes in ecosystem properties, such as soil C storage.

Impact of anaerobic bacterial activities on the dynamic and speciation of mercury in tropical soils in French Guiana

Mira TOUBASSY (SOL&EAU DIIM, PHD UPEC) Vanessa ALPHONSE & Noureddine BOUSSERRHINE

Mercury (Hg) is one of the most toxic heavy metals. Its dynamic and speciation represent a major environmental preoccupation. In French Guiana, dominant tropical oxisol soils poor in organic matter, contain high concentrations of Hg that accumulated with iron oxyhydroxides. These could affect probably the dynamic of Hg through iron-reducing bacterial activities. Therefore, this study aimed to determine these anaerobic bacterial activities in soils, and to associate the corresponding metabolism.
Ewen GEORGELIN (DCFE EERI, PHD UPMC) & Nicolas LOEUILLE

Evolutionary response of plant interaction traits to nutrient enrichment modifies the assemblage and structure of antagonistic-mutualistic communities

Ecological communities involve an amazing diversity of organisms and interactions. The interplay between different interaction types has important implications for the ecosytem dynamics of natural communities. With a theoretical model, we study how different selective pressures due to pollinators and herbivores affect the evolutionary dynamics of plant interaction traits that are involved in each type of interaction. We discuss the implications for agricultural landscape management.

Magnesium isotope variations in forest ecosystem to assess dolomite-liming effect in a granitic catchment

Emile BOLOU-BI (SOULAU BIOD, PHD UPEC), Etienne DAMBRINE (UMR 043 Centre Alpine de Recherche sur les Réseaux Trophiques des Ecosystemes Littorinaux CARBON, Station d'Hidrobiologie Lacustre) Benoît POUILLER*, Claude NYS* & Arnaud LEGOUT*

An Evo-Devo approach to assess the evolution of winglessness in ants

Julien BEHAGUE (ECCOEN ISE, POPOSTC CNRS), Romain PERONNET, Elhab ABOUIHEIR (McGill University, Canada) & Mathieu MOLETT

Winged queens and wingless workers in ants represent an extreme example of phenotypic plasticity. The aim of our study is to understand the genetic basis of winglessness during ant evolution. We study the wing genetic network in imaginal discs of developing larvae by combining whole mount in situ hybridizations and immunostainings. This allows us to compare the molecular signatures of ergotoid queens to workers and winged quees.

Impact of a grass roots, earthworm activity and organic content on physical properties of a constructed Technosol

Maha DEEB (SOULAU BIOD, PHD UPEC), Michel GRIMALDI, Thomas LERCH & Manuel BLOUIN

Construted technosol is an ecologial reclamation for degraded lands and that make necessary to understand the hydraulic properties of Technosol. So, we mixed (compost and deep horizon) to prepare 6 different technosols. Each mixture was placed into microcosm. For each mix, 4 possible combinations of the presence/absence of plant (Lolium perenne) and earthworm (Aporrectodea caliginosa) are done, they were kept 5 months into a climate chamber.

The water retention curve and the shrinkage curve were determined, before the occupation of climate chamber and after it.

Results show that the hydraulic properties are not additive directly after mixing.

Preliminary results underline that different types of water content are affected by the compost rates on which the effects of treatments are superimposed.

Neighbouring landscape and land use shape the local functional diversity of soil fauna

Florence DUBS (SOULAU BIOD, ex-CDD INRA), Benjamin PET*, Michael HEDDE*, Thibaud DECRAES (EA 1293 Etude et compréhension de la biodiversité ECODIV)

The aim of the study is to understand the respective influences of land use and neighbouring landscape on functional diversity of soil fauna. We found that the functional diversity increases with landscape contrast and that the functional redundancy decreases with the intensification of land use. The impact on the trait assemblage is done in a complementary way: the ecological traits are filtered by landscape contrast while the morphological traits are filtered by the intensification of land use.
12h40 Christian PEETERS

The fungus-growing ants : from simple gardening to industrial farming

An animation documentary on the evolution of agriculture in ants, by Christian PEETERS (ECOVO ISE, DR CNRS) & Jacobus J. BOOMSMA (Centre for social evolution CSE, Department of Biology, University of Copenhagen, Denmark)

Starting 50 million years ago, a remarkable series of adaptations in both fungi and ants led to this symbiosis found only in America. We compare three genera of fungus-growers.

Funded by European Research Council.

14h25 Sébastien BAROT

Ecosystem services must tackle anthropized ecosystems and ecological engineering

Sébastien BAROT (DCFE EMS, DR INRA), Luc ABbadie, Manuel BLOUIN, Nathalie FRASCARIA (AgroParisTech, INRA 8079 Ecologie, systématique, évolution) & Aleksandar RANKOVIC

Though the notion of ecosystem service is meant to serve as a guide for decision making the notion has never been applied in a comprehensive and consistent way to anthropized ecosystems. This means that anthropized ecosystems are either neglected or their services are assessed in a misleading way. We present a general framework that could be used to assess the ecosystem services provided by anthropized ecosystems and show that this could be useful to assess and compare practices of ecological engineering.

14h50 Romain FOUGEYROLLAS

Reproductive system in the soil-feeding termite Embiratermes neotenicus (Termiteidae, Syntermitinae)

Romain FOUGEYROLLAS (SOL&EAU DIIM, PHD UPEC), Virginie ROY, Robert HANUS (Institute of organic chemistry and biochemistry AS CR, Chemistry of Social Insects, Czech Republic) & David SILLAM-DUSSÉS

Termite colonies are typically founded by a king and a queen that produce other members of the colony. Here, we report a particular breeding system called Asexual Queen Succession (AQS) in a Termiteidae species, Embiratermes neotenicus. Under this process, the primary queen produces secondary reproductives asexually by means of parthenogenesis and the other members of the colony by sexual reproduction. These results will represent the first evidence of AQS reproduction in the Termiteidae family.

15h05 Anouk ZANCARINI

Exploring the structural and functional diversity of bacterial communities associated with bloom-forming cyanobacteria

Lin ZHU, Anouk ZANCARINI (DCFE COMIC, ATER UPMC), Imen LOUATI, Julie LELOUP & Jean-François HUMBERT

Structural and functional diversity of bacterial communities associated with different cyanobacterial cultures was assessed using 454-pyrosequencing and Biolog Ecoplates®. We show that both diversity and carbon catabolic capacity of the associated bacterial communities differed between the Cyanobacteria genera examined. The associated bacterial communities were highly diverse and differed mainly in the proportions of OTUs rather than by the presence or absence of specific taxa, similar to what we have observed in situ.

15h20 Andres LOPEZ-SEPULCRE

State-space models for inference and analysis of ecological processes : from evolution to ecosystem dynamics

Andrés LOPEZ-SEPULCRE (ECOVO VPA, CR CNRS)

State space modeling is a flexible statistical framework to infer the latent processes governing observed data. I here will discuss how they can be very powerful to study a variety of ecological processes when inference is combined with analysis of the underlying matrix or integral projection model describing the ecological dynamics of interest. To illustrate their power and diverse application, I will discuss two examples from my research on eco-evolutionary dynamics of rapid adaptation in Trinidadian guppies : (1) the study of natural selection when male reproduction can occur posthumously due to female sperm storage, and (2) the understanding of guppy ecosystem effects through the analysis of isotope tracer additions on a long-term experimental evolution experiment.

15h45 Michel RENOU

Probing the odorscape : how insects use environmental olfactory information to guide their movements

Michel RENOU (ECOSENS NEO, DR INRA)

Insects use chemical cues to locate vital resources. Male moths for instance orient in flight to a female sex pheromone. After its detection and encoding by a specialized olfactory subsystem the signal is translated into orientation behaviour. However, in natural environments the pheromone highly diluted during its transport by turbulent air appears intermittent and intermingled with other molecules. By sensory and behavioural approaches we aim to understand how moths find their way in such complex odorscapes.

Reproductive system in the soil-feeding termite Embiratermes neotenicus (Termiteidae, Syntermitinae)

Romain FOUGEYROLLAS (SOL&EAU DIIM, PHD UPEC), Virginie ROY, Robert HANUS (Institute of organic chemistry and biochemistry AS CR, Chemistry of Social Insects, Czech Republic) & David SILLAM-DUSSÉS

Termite colonies are typically founded by a king and a queen that produce other members of the colony. Here, we report a particular breeding system called Asexual Queen Succession (AQS) in a Termiteidae species, Embiratermes neotenicus. Under this process, the primary queen produces secondary reproductives asexually by means of parthenogenesis and the other members of the colony by sexual reproduction. These results will represent the first evidence of AQS reproduction in the Termiteidae family.
Impact of herbicides on competition between Cyanobacteria and Chlorophyceae in aquatic ecosystems
Kevin TAMBOSSO (T UPMC), Jean-François HUMBERT (DR INRA) & Catherine QUIBLIER (MNHN, UMR 7245 Molécules de communication et adaptation des micro-organismes MCAM)

Integrative ecology : from mechanisms to ecosystem services - EMS
The δ15N isotopic signature of pollinating insects along an urbanization gradient in the Ile-de-France region
Anne BARBILLON (SupAgro), Aleksandar RANKOVIC (PHD UPMC), Yannique VAURY (IE UPMC), Isabelle DAJOZ (PU Paris VII) & Benoit GESLIN (ATER UVSQ)

Street tree Ecohydrology : a project to study street tree water use strategies and their consequences for managing tree cooling effects
Ambre DAVID (PHD UPMC), Aleksandar RANKOVIC (PHD UPMC), Thierry BARIAC (DR CNRS), Patricia RICHARD (AI CNRS), Matthieu BAGARD (MC UPEC), Jean-Christophe LATA (MC UPMC), Sébastien BAROT (DR IRD), Jérôme NGAO (INRA, Physique et physiologie intégratives de l'arbre fruitier et forestier, site de Crouël), Claire DAMESIN (UMR 8079 Ecologie Systématique et Evolution, Univ. Paris-Sud) & Luc ABBADIE (PU UPMC)

Community diversity and ecosystem functioning Department - DCFE

Distribution and loss rates of Faecal Indicator Bacteria (FIB) in the Red River, Viet Nam
Thi Mai Huong NGUYEN (PHD UPMC), Thi Phuong Quynh LE (Institute of Natural Product Chemistry, Vietnam Academy of Science and Technology), Josette GARNIER (CNRS, UMR 7619 Milieux environnementaux, transferts et interactions dans les hydrologies et les sols METIS) & Emma ROCHELLE-NEWALL (CR IRD)

Impact of herbicides on competition between Cyanobacteria and Chlorophyceae in aquatic ecosystems
Kevin TAMBOSSO (T UPMC), Jean-François HUMBERT (DR INRA) & Catherine QUIBLIER (MNHN, UMR 7245 Molécules de communication et adaptation des micro-organismes MCAM)

Social interaction in evolution - ISE
Evolution de la parthénogénèse chez la fourmi Cataglyphis cursor :
reconnaissance de la ponte d’ouvrières dans les colonies à reine
Anna MAZALEYRAT (ex M2), Thibaud MONNIN (CR CNRS) & Claudie DOUMS (CNRS UPMC MNHN, UMR 7205 ISYEB, Département SE)

Rôle de la mort cellulaire dans le développement et l’évolution des castes de fourmis
Romain PERONNET (T CNRS), Julien BEHAGUE (PHD CNRS) & Mathieu MOLET (MC UPMC)

Phenotypic variability and adaptation - VPA
An automated image analysis system to measure and count organisms in laboratory microcosms
François MALLARD (ATER UPMC), Vincent LE BOURLOT (ex-PHD), Thomas TULLY (MC EPSE)

Annual Austrolebias killifish : a vertebrate model for comparative eco-evo-devo
Tom J. M. VAN DOOREN (CR CNRS)

Evolutionary ecology Department ECOEVO

Chemoreception and adaptation - CREA
Impact of Bisphenol A, an endocrine disrupting chemical, on insects
Catherine BLAIS (MC ES), Annick MARIA (TR INRA) & David SIAUSSAT (MC UPMC)

qPCR and proteomic use in the environmental science
Françoise BOZZOLAN (IE UPMC), Virginie BRAMAN (AI UPMC) & Annick MARIA (TR UPMC)

Oviposition behavior of Paysandisia archon (Lepidoptera : Castniidae)
Rachid HAMDI (POSTDOC INRA) & Brigitte FREROT (IR INRA)

NGS and RNAseq : applications to chemoreception and its plasticity in a moth
Emmanuelle JACQUIN-JOLY (DR INRA), Erwan POIET, Aurone GALLOT, Fabrice LEGEM (BFPA, Rennes) & Nicolas MONTAGNE (MC UPMC)

Effect of sublethal doses of pesticides on olfactory system and olfacto-driven behaviors in insects
Annick MARIA (TR UPMC), Virginie BRAMAN (AI UPMC), Françoise BOZZOLAN (IE UPMC), Marine MAIBECHE (PU UPMC) & David SIAUSSAT (MC UPMC)

Targeted genome engineering using CRISPR/Cas9 to perturb olfaction in the noctuid Spodoptera litoralis
Christelle MONSEPPE (AI INRA), Fatiou KOUTOUOU (POSTDOC INRA), Marie-Christine FRANÇOIS (TR INRA), Nicolas MONTAGNE (MC UPMC), Corinne ROYER (INRA, UMR 283 Biologie Fonctionnelle Insectes et Interactions BF2I, Entomotoxines), Jean-Paul CONCORDET (MNHN, UMR 7196 Régulations et dynamique des gènes), Emmanuelle JACQUIN-JOLY (DR INRA)

Neuro-ethology of olfaction - NEO
Investigating odor-guided insect flight trajectories in a wind tunnel
Matthieu DACHER (MC UPMC), Michel RENOU (DR INRA) & Didier ROCHAT (CR INRA)

Molecular mechanisms of odor integration in insects
Céline DEFAY (ex-PHD INRA) & Philippe LUCAS (DR INRA)

No sex without food : atypical plant odour responses in the pheromonal processing system of a male moth
Nina DESIG (CR INRA), Angela ROUY (ex-PHD), Fabienne DUPUY*, Sylvie ANTON* & Michel RENOU (DR INRA)
* UPR5 EA 2647 USC INRA 1330, Laboratoire Recepteurs et Canaux Ioniques Membranaires RCM, Université d’Angers

Molecular mechanisms of olfactory plasticity in insects
Lynn DUPONTET (MC Paris Sud), Stéphane DEBERNARD (MC UPMC), Antoine ARBIEUX* & Christophe GADENNE *
* UPR5 EA 2647 USC INRA 1330, Laboratoire Recepteurs et Canaux Ioniques Membranaires RCM, Université d’Angers
**Olfactory coding in moths**
Christelle MONSEMPES (AI INRA), Élodie DEMONDION (TR INRA), Vincent JACOB (PHD INRA) & Philippe LUCAS (DR INRA)

**Synergistic attraction to pheromone-plant odours in an invasive beetle : trajectometer studies**
Didier ROCHAT (CR INRA), Philippe COUZI (TR INRA), Philippe LUCAS (DR INRA) & Jean-Baptiste MASSON (CNRS, URA 2171 Physics of Biological Systems, Institut Pasteur)

**Analyzing flying and walking search strategies using flight simulators and EAD**
Christopher WHEELER (POSTDOC INRA), Didier ROCHAT (CR INRA) & Philippe LUCAS (DR INRA)

---

**Soil and water sciences Department - SOL&EAU**

**Isotopic ecogeochemistry - ECOISO**
Determination of root water uptake under controlled conditions from isotopic measurements of transpired water vapour
Philippe BIRON (IR UPMC), Patricia RICHARD (AI CNRS), Eloise LEROUX, Anne-Lise LEHUEN, Jean-Louis DURAND (INRA, UMR 004 P3F Unité de Recherche Pluridisciplinaire Prairies et Plantes Fourragères) & Thierry BARIAC (CR CNRS)

Isotopic eco-geochemistry : equipment & analysis
Patricia RICHARD (AI CNRS), Philippe BIRON (IR UPMC) & Véronique VAURY (IE UPMC)

**Biophysical functioning of soil - BIOPHYS**
A modelling approach to quantify wind erosion fluxes in southern Tunisia
Christel BOUET (CR IRD), Mohamed TALBI LABIADH**, Gilles BERGAMETTI*, Bénédicte LAURENT*, Badie ATTOUI*, Jean Louis RAJOT (CR IRD), Béatrice MARTICORENA*, & Houcine KHATTELI**

* CNRS, UMR 7583, Laboratoire Interuniversitaire des Systèmes Atmosphériques
** Institut des Régions Arides, Tunisia

Use of modeling in the irrigation management under water scarcity
Georges NIROIS** (CR IRD), Jean-Pierre MONTOROI (CR IRD), Alaa ZAGHLOUL*, Raafat ALI* & Mohammed SABER*

* National research centre NRC, Soils and water use department, Egypt
** National Agriculture and Forest Research Institute NAFRI, Lao P.D.R

**Differentiation in roots dynamic, water uptake and carbon storage of teak tree (Tectona grandis) in northern Laos under a throughfall exclusion**
Jean-Luc MAEGHT (IE IRD), Corentin CLEMENT*, Oloth SENGTAUEHANGHOUNG*, Necia STORES (INRA, Botanique et bioinformatique de l’architecture des plantes AMAP) Olivier ROUSSET & Alain PIERNET (CR IRD)

* National Agriculture and Forest Research Institute MAPFRE, Laos P.D.R.

---

**Plants-environment interactions - IPE**
Study of the impact of ozone on field-grown maize using a free-air enrichment system
Ahmed RAMANI (PHD UPEC), Luis LESTER (MC UPEC), Matthieu BAGARD (MC UPEC), Jean-François CASTELL (AgroParisTech, UMR 1099 Environnement et grands cultures EGG) & Anne REPELLIN (PU UPEC)

**Guest team posters**

**Plant adaptation to saline environment**
Marianne BORDENAVE-JACQUEMIN, Cécile CARRASSA, Pierre CAROL, Emilie CHILLAT, Anne GUIRACHI, Sandrine LANFRANCHI, Régis MALDINEY, Séverine PLANCHAIS, Luc RICHARD & Arnaud SAVOURE

Plant responses to water stress : an interplay involving mitochondria, arginine, urea and nickel
Séverine PLANCHAIS, Cécile CARRASSA, Arnaud SAVOURE & Pierre CAROL

Olfactory sensitivity of the destructive lepidopterous Spodoptera littoralis for various Arabidopsis thaliana ecotypes
Cécile CARRASSA, Anouch MARIA, Régis MALDINEY, Arnaud SAVOURE & David SIAUSSAT

* Adaptation des plantes à des contraintes environnementales APEC UPMC URF 5

---

**Posters**

**Plant adaptation to saline environment**
Marianne BORDENAVE-JACQUEMIN, Cécile CARASSA, Pierre CAROL, Emilie CHILLAT, Anne GUIRACHI, Sandrine LANFRANCHI, Régis MALDINEY, Séverine PLANCHAIS, Luc RICHARD & Arnaud SAVOURE

**Olfactory sensitivity of the destructive lepidopterous Spodoptera littoralis for various Arabidopsis thaliana ecotypes**
Cécile CARASSA, Anouch MARIA, Régis MALDINEY, Arnaud SAVOURE & David SIAUSSAT

* Adaptation des plantes à des contraintes environnementales APEC UPMC URF 5

---

**INRA Versailles campus map**
Special thanks to INRA SDAR «Services Déconcentrés d’Appui à la Recherche» and to iEES Paris accounting and administrative staff

http://ieesparis.ufr918.upmc.fr/