KPC at KLS

MINI SYMPOSIUM

Monday 14th June 2021

15:00 – 16:30
via Zoom

Access Details:

https://geomar-de.zoom.us/j/85394388791?pwd=YVNFWFhRZTduVjBPNXpLOWk0NVA2UT09

Meeting-ID: 853 9438 8791
Code: 820790

Duration of scientific lectures: 15 min + 5 min discussion.
Please remember to mute your microphone!

Chair: Dr. Martina Blümel, Research Unit Marine Natural Product Chemistry/GEOMAR Centre for Marine Biotechnology, GEOMAR Helmholtz Centre for Ocean Research Kiel

15:00-15:05
Welcome by Host
Prof. Dr. Deniz Tasdemir, Research Unit Marine Natural Product Chemistry/GEOMAR Centre for Marine Biotechnology, GEOMAR Helmholtz Centre for Ocean Research Kiel

15:05-15:15
Introduction to Kiel Plant Center (KPC)
Prof. Dr. Eva Stukenbrock, Botanical Institute, Environmental Genomics Group, Kiel University and Max Planck Institute for Evolutionary Biology Plön, Spokesperson Kiel Plant Center

15:15-15:25
Introduction to Kiel Life Science (KLS)
Prof. Dr. Thomas Bosch, Zoological Institute, Dep. Cell and Developmental Biology, Spokesperson Kiel Life Science

15:25-15:45
Dr. Angela Stevenson, Postdoctoral Researcher, Marine Evolutionary Ecology group, GEOMAR

Seagrass conservation and restoration in Germany can help mitigate climate change

Abstract: It is now well established that coastal vegetated ecosystems, such as mangroves, seagrasses, and salt marshes, known as 'coastal blue carbon', have a disproportionally high potential to store carbon within the sediment relative to other coastal habitats. However, large error margins are found in their contributions to carbon sinks because estimates differ globally (i.e. tropical vs. temperate environments) and even regionally. Consequently, it is difficult to apply ecological economic approaches to provide accurate economic valuations of this important ecosystem service without introducing a large degree of uncertainty. The German coast is home to lush meadows of seagrass, spanning 462 km^2, with a much greater area (3064 km^2) available for coastal restoration. From our work, we now know that sediments below seagrass meadows along the German Baltic Sea coast store 2-60 times more organic carbon than sediments without seagrass. Here, they store an average of 10,700 gC/m^2, 18 times greater than other parts of the Baltic Sea (outside of Germany). Generally, more organic carbon is stored in seagrass meadows sheltered from wave exposure, but there are instances of carbon hot spots with 50x more carbon than in the baseline. Radiocarbon dating suggests these hot spots originate from pre-existing terrestrial carbon deposits, such as peatland habitats inundated by rising sea levels during the last glaciation. Based on these measurements, we can avoid 11.5-46 Mt of CO_2 emissions via their conservation (Baltic Sea only), and sequester 404 kt of CO_2 emissions per year via their restoration. With our inventory of carbon stocks we will be able to advise on seagrass contributions to the German national carbon budget, as well as determine how to protect (via conservation) and enhance (via restoration) these stocks.
Learn more here: https://www.helmholtz-klima.de/en/aktuelles/we-found-unexpected-blue-carbon-hotspots

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Chair: Dr. Ernest Oppong-Danquah, Research Unit Marine Natural Product Chemistry/GEOMAR Centre for Marine Biotechnology, GEOMAR Helmholtz Centre for Ocean Research Kiel

15:45-16:05
Dr Carolina S. Francisco, Botanical Institute, Environmental Genomics Group, Kiel University and Max Planck Institute for Evolutionary Biology Plön

Different approaches toward sustainable disease control

Abstract: Plants interact with various microbes and serve as a habitat for microbial communities. Microbes occupy a wide range of plant niches that can impose different environmental constraints on their growth, reproduction, and survival, and thus play a crucial role in the maintenance and depletion of microbial diversity. The interactions between plants and their respective microbiomes range from mutualistic/ beneficial though commensal to pathogenic interactions. Here, we studied different aspects of plant- and microbe-microbe interactions using *Zymoseprotia tritici* as a model organism, which is the most damaging fungal pathogen of wheat in Europe. We first evaluated the effect of a well-known medical biomolecule to control *Z. tritici* in vitro and in planta. Next, we characterize resilient microbial species that remain in the apoplastic fluids of wheat plants during the induced local and systemic immune responses. Finally, we analyzed the proteome catalog of the apoplastic

fluids to identify secreted proteins that may mediate *Z. tritici*-wheat interactions. The knowledge developed in these studies may contribute to increasing interest in the development and utilization of microbial biocides and biomolecules as biocontrol agents in agriculture.

Chair: Dr. Martina Blümel, Research Unit Marine Natural Product Chemistry/GEOMAR Centre for Marine Biotechnology, GEOMAR Helmholtz Centre for Ocean Research Kiel

16:05-16:25
Dr. Karin Schrieber, Institute for Ecosystem Research, Kiel University

Sex-specific effects of inbreeding on plant interactions with pollinators

Abstract: Plants use a wide range of floral attributes (colour, scent, spatial arrangement, food-rewards) to advertise themselves to pollinating animals. Human activities can directly and indirectly interfere with these signals to disrupt plant-pollinator interactions. Ongoing habitat degradation reduces the size of plant populations, thereby increasing the risk of mating closely related individuals. While it is well-known that inbreeding may reduce plant viability in the offspring generation, its effects on attractiveness to pollinators are less well understood, despite their potential relevance for the rapid retraction of plant populations. We studied whether inbreeding may have particularly fatal consequences for the dynamics of dioecious plant populations by diminishing floral attractiveness disproportionally in one sex. We assessed flower colour, scent, spatial arrangement, and rewards as well as pollinator visitation rates in experimentally inbred and outbred, male and female *Silene latifolia* individuals originating from 16 populations in the northern hemisphere. We found that inbreeding specifically impairs spatial flower traits and floral scent composition and that these changes cause negative feedback on pollinator visitation rates. Our results support that sex-specific selection and gene expression have magnified these inbreeding costs for females. We discuss that this may bias pollinator visitation towards males, thereby decreasing pollination success and accelerating population retraction.

16:25-16:30
Closing remarks (Deniz Tasdemir)

16:30
End of meeting

The Speakers:

Dr. Angela Stevenson

Dr. Angela Stevenson is currently a Postdoctoral Researcher of seagrass Blue Carbon, in the Marine Evolutionary Ecology group in GEOMAR, funded by the Helmholtz Initiative for Climate Adaptation and Mitigation. She is a benthic ecologist who specializes on crinoids, echinoids, and glass sponges in shallow to deep-sea habitats. The central theme of her work exploits the strong link between benthos and their predators to learn about deep-water ecology, how we shape it, and how we (and shallow habitats) can benefit from it. Dr. Stevenson conducted much of this research as a MEOPAR and UBC Ocean Leaders Postdoctoral Fellow in the Botany Department in Trinity College Dublin, Ireland, and Department of Zoology and Institute for the Oceans and Fisheries at the University of British Columbia, Canada. She is the co-founder of the Wild Postcard Project, a biodiversity-themed art competition aimed at getting kids and teens excited about their local plants and animals – we'll be hosting this competition in Germany this year, so stay tuned: https://wildpostcardproject.com/

Dr. Carolina S. Francisco

Carolina Sardinha Francisco is a postdoc in the group of Eva Stukenbrock at Kiel University. She is interested in the different aspects of plant- and microbe-microbe interactions with the aim of identifying biocontrol agents for sustainable disease control. Her postdoc project includes studies on microbial communities to identify antagonistic microbial interactions, screening of biomolecules with antimicrobial activities, and proteomic analysis of plant apoplast to pinpoint proteome catalogs associated with plant-microbe interactions.

Dr. Karin Schrieber

Since 2019, Dr. Karin Schrieber is working as an assistant professor in the Geobotany group of Prof. Alexandra Erfmeier at Kiel University. Her research focuses on the performance and evolution of natural plant populations under human-mediated changes to environmental stress regimes and the consequent dynamics of plant distribution ranges. She studied Biology at Halle University and joined the Plant Ecology group of Prof. Isabell Hensen for a PhD project on plant invasion ecology (2012-2016), which was implemented in Europe and North America in collaboration with Prof. Steven Keller from the University of Vermont. Between 2016 and 2019, she deepened her research with a focus on local plant adaptation as a Post-Doc in the Chemical Ecology Group of Prof. Caroline Müller at Bielefeld University before starting her position at Kiel University.