PARIS LODRON UNIVERSITÄT SALZBURG

Umwelt & Biodiversität

SEMINAR SERIES ENVIRONMENT & BIODIVERSITY

Guest Lecture

Assoz. Prof. Dr. Sabine Agatha

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Fachbereich Umwelt und Biodiversität, AG Protistologie

A Multidisciplinary Approach for Investigating Ciliates (Alveolata, Ciliophora)

This presentation delves into the world of microscopic organisms, specifically marine planktonic ciliates, a group within the vast diversity of unicellular eukaryotes. We investigate various aspects of these minuscule cells through a multidisciplinary approach integrating genetic methodologies such as metabarcoding, phylogenetics, and transcriptomics, alongside microscopic techniques including light, scanning, and transmission electron microscopy. Our metabarcoding study revealed significant disparities in planktonic ciliate communities between Chinese and European coastal waters, indicating biogeographic patterns typically attributed to multicellular organisms. Based on morphological and molecular data, we established a novel genus within tintinnids, a group of ciliates known for their intricate vase-shaped loricae (shells), predominantly measuring less than a third of a millimetre in length. To facilitate the integration of molecular data with morphological analyses in taxon diagnoses, we developed the web-based tool DeSignate. Its application to detect signature characters in multisequence alignments is exemplified in a bioinformatic approach with data from marine planktonic ciliates. Despite unresolved phylogenetic relationships, our ultrastructural studies provide crucial insights into the lorica-forming tintinnid ciliates. We employed transmission and scanning electron microscopy to investigate the capsules, nano harpoons, as well as the variety of lorica wall structures, aiding in hypothesizing relationships. We were the first to ultrastructurally investigate a tintinnid resting cyst, revealing their ability to generate different wall materials to withstand adverse environmental conditions. Our current project focusses on understanding how tintinnids form their loricae. We volumetrically analysed the intracellular material and compared it with the final wall volume of the lorica, detecting astonishing differences. In a next step, transcriptomic analyses of single tintinnid cells are conducted to reveal tintinnid-specific gene families, potentially harbouring key genes in lorica formation. In essence, our journey through this microscopic world illuminates the fascinating intricacies of tintinnid biology, offering glimpses into the mechanisms underlying their remarkable adaptations and evolutionary relationships.

Friday, May 24, 2 PM

NLW-Faculty, Room 421, 2nd floor

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