

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

Summer 2025



UNIVERSITÄT
BAYREUTH

Donnerstag/Thursday

15.05.2025

12:30 in H6, GEO



Ting-Shen Han

Max Planck Institute for Plant Breeding Research,
Cologne

Polyploid adaptation to extreme environments

Polyploidy is a major evolutionary force that can facilitate adaptation to diverse and challenging environments. This study explores the mechanisms underlying polyploid adaptation across various harsh habitats, including mountains, tropical regions, and islands, using the polyploidy-rich genus *Rorippa* as a model system. By integrating population genomics, quantitative and ecological genetics, we unravel the complex interplay between genomic and environmental factors driving polyploid diversification. Our findings demonstrate that allopolyploidization plays a crucial role in adaptation. In *R. elata*, a high-altitude species in the Hengduan Mountains, we identified a group of selectively swept genes associated with stable meiosis, suggesting their importance in the establishment and diversification of this polyploid lineage. In *R. indica*, an allohexaploid species native in East Asia, we observed an association between evolved genome size expansion and adaptation to seasonally stable environments, probably during its recent colonization into tropical areas in Southeast Asia. Finally, in *R. sarmentosa*, an island endemic scattered in the Pacific Ocean, we reconstructed the origin of polyploidy through long-distance dispersal events. These studies collectively highlight the interconnectedness of cellular and habitat adaptation in polyploid plants. Our findings provide valuable insights into the drivers and consequences of polyploidy, with significant implications for understanding plant responses to climate change and for developing more stress-tolerant crops.

