MPI-NAT SEMINAR SERIES

Thorsten Reusch

GEOMAR Helmholtz-Centre for Ocean Research Kiel, and Kiel University

Evolving Clones

Clonal reproductive systems abound among terrestrial and marine species, and include important ecosystem engineers such as corals, macroalgae and seagrasses, yet this lifestyle is often ignored in evolutionary biology. A genet (synonymous to clone) originating from sexual reproduction gives rise to a population of independent modules (=ramets) that can grow to very large size (km2). For many genets, their age based on spatial extent has been estimated to be >1000 yrs, prompting the question as to how these organisms prevent mutational meltdown owing to increasing load of somatic mutations. Moreover, according to conventional wisdom, under a clonal mode of reproduction, (adaptive) evolutionary change is impossible. Using full-genome data from the model seagrass Zostera marina (eelgrass), I show that clones evolve. Through a process of somatic genetic drift, somatic genetic variation (SOGV) is segregating among modules (ramets) when the cell population involved in module foundation is finite. Upon calibration using genets of known age, an absolute dating of genet ages was possible as SOGV accumulate linearly with time. Findings of within-genet genetic differentiation may also explain a long-standing ecological riddle, namely how large and old clones can productive and resilient through time, an observation inconsistent with the notion of genetic diversity being critically important for population viability. Ongoing work tries to detect asexual selective sweeps among clonal lineages for which methods from cancer evolutionary genetics are adapted to free-living clones. Findings of within-genet genetic diversity have implications for defining individuality in modular species, and suggest that some conservation genetic rules need to be revisited for clonal species.

Tuesday, 27 May 2025, 2:00 p.m.

Fassberg Campus / Ludwig Prandtl Hall

Host: Jochen Rink

EvoReSt

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