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# How to define the selective environments in which symbiotic communities evolve in?

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## Abstract

Session : Selection at the level of the community and ecosystem (Karine Prévot, Frédéric Bouchard, Manuel Blouin, Charles Goodnight)

Symbiotic associations force us to examine the relationship between the adaptive success of a community and the adaptive success of the constituting individual organisms. The emergent symbiotic individual qua integrated functional unit appears to have a distinct adaptive success from that of its parts. This allows for the possibility of selection acting on this higher level of organisation with resulting emergent adaptations. Symbiosis in insects, more specifically symbioses involving *Wolbachia* is helpful to think about the selection process at the community level. Mechanisms such as apoptosis or immunological tolerance that make it possible for the host to tolerate its new partner provide new and distinct adaptations that are absent from symbiont-free insects.

Many have discussed the idea that communities could emerge as new units of selection, arguing that there is fitness transfer between levels of organisation that make it possible for new units of adaptations to emerge. What has not been sufficiently discussed is that the transiency of many symbiotic associations makes such fitness transfers difficult to identify and track through time.

In this presentation, using the example of *Wolbachia*, we focus on how ecological conditions at the community level affect how we can define and construe selective environments for communities in general and symbiotic communities in particular. In traditional evolutionary accounts, the individual and the species are relatively stable and the environments properties fluctuate. In the case of communities, the stability premium belongs to the environment while the unit of selection is less stable. We will explain how this asymmetry should inform our understanding of community evolution.

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