

Divergence and constraint in the origin of new species

The origin of new species creates biological diversity and understanding species formation is thus a key goal in biology. In this talk, I will tackle the issue of why some populations that begin the speciation process diverge further than others, a phenomenon central to understanding diversification. Using a combination of theoretical modeling and empirical studies of plant-feeding insects I will show how adaptation to different ecological environments generally promotes speciation. However, this process can be constrained or counteracted by numerous factors. Specifically, speciation can stall 'partway' before completion due to: an insufficient number of genetic differences underlying adaptive divergence, ecological shifts that are too modest to drive strong divergence, and selective processes that increase genetic mixing between populations. The origin of new diversity thus reflects a balance between these factors driving and constraining evolutionary divergence.