



Climate change and thermal responses across diel and seasonal cycles in subtropical Lepidoptera (butterflies and moths)

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About the speaker

Ling Yuet Fung is a PhD candidate supervised by Prof. Timothy Bonebrake in the Global Change and Tropical Conservation Lab. His research explores the thermal responses of subtropical butterflies and moths across diel and seasonal cycles.

Abstract

Tropical ectotherms are vulnerable to global climate warming and land use changes as they are adapted to limited thermal variation and are living close to their thermal optimum. In this thesis, I investigated the climate responses of subtropical Lepidoptera (butterflies and moths) on their adaptations to diel and seasonal cycles from the individual to community levels. In the first data chapter, heat tolerance was found to be consistent across starvation treatments and seasonal morphs in a tropical butterfly *Mycalesis mineus*, revealing their capacity to cope with extreme heat under simultaneous stresses. In the second data chapter, distinct thermoregulatory strategies were demonstrated between diurnal and nocturnal insects, likely translating into distinct thermal challenges under climate change. In the third data chapter, an increase in community temperature index (CTI) and an influx of tropical species indicated a restructuring of butterfly communities in Hong Kong modulated by an interplay of climate, habitat, and range shifters. In the fourth data chapter, a west-to-southwest direction of movement was consistently found in of *Euploea* butterflies in Hong Kong through tagging recoveries and flight release experiments, but further work is important to recognize the winter migration and climate vulnerability of this multi-species wintering system. Through these chapters, my thesis highlights the sensitivity of subtropical ectotherms across different timescales to global changes in climate and habitat.

