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UNDERSTANDING THE IMPACTS OF CLIMATE CHANGE ON LEPIDOPTERAN POLLINATOR COMMUNITIES: INSIGHTS FROM A 30-YEAR DATASET IN FINLAND

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ABSTRACT

Global warming poses a significant threat to pollinating insect communities. There is limited understanding of how individual species respond to climate change and how their responses contribute to community-level changes. Lepidoptera (both nocturnal moths and diurnal butterflies) contribute to multiple ecosystem functions. Acting as pollinators, herbivores and food for higher trophic levels, they contribute to both ecosystem services and disservices. Importantly, Lepidoptera have been shown to be particularly sensitive to land-use and climatic change due to their close and complex relationship to plants as both larvae and adults. Nonetheless, the extent to which the temperature responses of individual species vary with their traits (such as hibernation stage, host plant and habitat use) is poorly characterised – and how such species-specific responses reflect into community change with climate warming remains unknown. To address these knowledge gaps, we are currently examining the responses of Lepidopteran communities to warming climatic conditions in Finland using a comprehensive 30-year observational dataset for over 1,600 species. More specifically, we are analysing the relationship between species-specific traits and the Species Community Temperature Index (STI), and between STIs and changes in species relative representation in communities. Here, the latter change will contribute to shifts in the Community Temperature Index (CTI). Our approach allows us to uncover the factors driving current shifts in Finnish pollinator communities, and provide a mechanistic understanding of shifts in the community-level trait distribution.