

Heat waves: Stupor in Arctic Bumblebees

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The current worldwide biodiversity undergoes one of the largest species extinction. Biodiversity decline results from numerous interacting factors, especially climate change. One of the main phenomenons related to climate change is the increase of the frequency of extreme event such as heat waves. Since the heat waves dramatically increase the bee mortality, the worldwide key pollinators, there is an urgent need to predict the consequences of heat waves on important organisms for ecosystem services. However these predictions remain difficult without bioassays because of each species have its own thermo-tolerance.

In this study, we develop a comparative bioassay approach in 6 species of widespread, arctic and mountainous bumblebees using a new experimental portable device to determine the heat stress tolerance in order to predict consequences of local heat waves.

Our results show a thermo-tolerance gradient: the thermo-tolerance of Arctic species is lower than the thermo-tolerance of mountainous species which is itself lower than widespread species. This study paves the way to a large scale assessment of heat stress tolerance of insects, a further step in their conservation.