Earth is, on average, becoming warmer and the climate more variable. Recent models of climate change predict more extreme weather events, including those of increased magnitude, frequency and greater duration. During extreme weather events such as heatwaves (**HW**), daily temperatures reach or exceeds recorded maxima over several days. These conditions put stress on ecological communities and ecological processes at all levels of organisation, causing catastrophic ecosystem disturbances.

Ectotherms in particular rely on ambient temperature. This translates into negative change of growth rate and development in many plant and animal species under thermal stress. Thus, exposure to extreme temperatures typically reduces fitness parameters (i.e. survival and reproduction), overriding the expected beneficial effects of mild increases in mean temperatures. Some evidence supports the notion that high temperatures might be more detrimental than lower ones for ectotherms, for example because many terrestrial ectotherms live under conditions that are close to their thermal maxima. Therefore, to gain insight into the impact of global warming on ecosystems, it is pivotal to predict and understand the impact of the extreme temperatures on the life history of ectotherms.

Extreme weather events may be of special concern when they impact organisms which are key components for the functioning of an ecosystem. Key groups, such as insect pollinators, often provide various ecosystem services important for agriculture and the human economy. The Intergovernmental Panel on Climate Change predicts that food security will be increasingly threatened in this century due to increased climate variability, including the increased frequency and magnitude of extreme weather events. However, the role that extreme temperature events could play in the fate of pollinators and pollination is obscure. Moreover, previous studies have typically measured direct effects of thermal stress on plants but not on insect pollinators, potentially missing important changes in the interactions between plants and their pollinators following extreme weather events.

Extreme weather events can affect biological systems in various ways, ranging from molecular responses in single individuals to ecosystem structure and functions. Changes in fitness of organisms, and therefore changes in their biological interactions, are key mechanisms that link the effects of extreme weather events across different levels of organisation. Thus, an experimental study will be performed to assess impact of HW of different magnitude, frequency and duration on the fitness parameters of pollinators, and as a result their pollination efficiency. Special attention will be paid to the red mason bee and European orchard bee as well as strawberry pollination, as a model pollination system. Fitness parameters of the pollinator will include measurements of survival and development reflecting condition as well as the efficiency of pollination will include seed set and fruit quality.

In summary, the project will deliver results that enable a comprehensive understanding of the impact of HW on the fitness parameters of pollinators and, as a result, their pollination efficiency. The global scale and rapidity of environmental changes is challenging ecologists to reimagine their theoretical principles and management practices. Thus, the project tries to connect basic ecological questions about life-history response to climate change, with focus on the benefits for society, i.e. ecosystem services, which is not a common approach. The findings of the project will allow an understanding of the impact of extreme weather events on pollinators and explain ecosystem service distribution in the changing world, in a way that has not to date been studied comprehensively.