

SFE² GfÖ EEF

Joint meeting, International Conference on Ecological Sciences

"Ecology and Evolution: New perspectives and societal challenges"

21-25 Nov 2022 Metz (France)



Ecology & Evolution: New perspectives
and societal challenges

PROGRAMME

Organized by :



& North Eastern France Labs in Ecology & Evolution



European Ecological Federation

GfÖ-SFE²-EEF Joint meeting 2022, 21-25 Nov Metz (France)

Risk factors affecting honey bee thermoregulation as potential mechanisms underlying colony overwintering failure

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Oral presentation desired.

Theme:

1. Ecology and Evolution: from raising alarm to inspiring new paths
2. Behavioural and dispersal ecology

Abstract:

In temperate regions, the lack of resources and low temperatures make winter a critical period for the survival of many species. Low temperatures are particularly impactful on ectothermic species such as insects, but some species have developed social strategies to survive. During winter, individual workers of the Western honey bee (*Apis mellifera*) group in the hive as a cluster and produce heat by thoracic contraction. The energy needed for producing heat is obtained by the consumption of the honey reserves accumulated during the summer season. Interestingly, although the high mortality rate of honey bee colonies is well documented since 30 years, the ecological mechanisms underlying the colony overwintering failure are still unclear. Surprisingly, very few is known on the effects of biotic and abiotic factors on winter colony thermoregulation. We will present an overview of the current knowledge linking risk factors, ecological mechanisms and the failure in honey bee colony overwintering. To do so, we carried out a systematic review considering 50 articles, for which we will present the main outcomes. Moreover, we will present preliminary results of an international field experiment developed in the frame of the European H2020 project BeeConnected. Given that opening beehives during the winter endangers the colony survival by disturbing its thermoregulation, collecting field data on winter colony dynamics is challenging. The BeeConnected project aims at lifting the veil on this knowledge gap using Information and Communication Technologies (ICT) as a tool for automatic monitoring of biological processes of honey bee colonies during winter, using on-board electronics and computing. We monitored the temperature of 135 connected beehives distributed over France, Germany and Greece, along gradients in climate and landscape composition. We will discuss the results on the potential combined effects of climate and landscape on the thermoregulation of honey bees in winter. The results will help understanding the risk factors and mechanisms involved in honey bee mortality towards management recommendations for anticipating or prevent colony overwintering failure.