

**OR056**

*ASSISlbF: A new pathway to examine collective behaviours in honeybees*

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Collective behaviours in honeybees is a challenging field of research due to the various communication channels and cues the animals use for decision making and the performance of collaborative tasks. In previous experiments in a temperature arena with a complex thermal gradient we found that only a minority of tested single young bees is able to locate themselves at their temperature optimum of 36°C. In contrast to that we found that a sufficiently large group of bees aggregates at the optimum and is even able to discriminate it from a suboptimal temperature spot. Thus we conclude that the bees collectively choose the optimum and perform collective decision making. Furthermore, we were able to interfere with the group decision by introducing confined bees in a suboptimal temperature spot. The bees were then collectively lured to the suboptimum. In the presented EU funded project ASSISlbF we now aim for developing a novel method to further examine the underlying mechanisms of collective behaviours. We are investigating various stimuli (e.g., vibration, light) with regard to the behavioural response of the bees (e.g., attraction, repulsion). The findings will lead to the development of static robotic devices able to interact with the honeybees and interfere with the group decision by using multiple communication channels and signals. We will establish an experimental setup with a robotic array that will be able to interact autonomously with the bees and adapt by evolutionary algorithms. We aim for generating a mixed group of robots and honeybees, enabling us to investigate the collective processes from the inside of this bio-hybrid society. Adapted to various other species this technology may lead to new methods in e.g., live stock or pest management in the future.