

OR175*Individual differences in honeybee trophallaxis network connectivity*

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Liquid food exchange (trophallaxis) is a common social interaction that fulfills important functions in many social insect societies. In honeybees, trophallaxis has been extensively described in the context of feeding and the transport of materials. In addition, it has been implicated as a communication channel through which honeybees may transmit chemical signals to coordinate their flexible age-related division of labor. As a first step to experimentally test this hypothesis, we studied the pattern of trophallaxis interactions in single-cohort colonies made of 1000 individually marked day-old bees, in which there is initially no division of labor. Within one week these colonies partition into hive bees and foragers, allowing us to study if there is a relationship between the timing of an individual's age at onset of foraging and the pattern of trophallaxis interactions she experienced. To enable an experiment of this nature, we developed a novel method to automatically identify and track all bees living inside a glass-walled observation hive with high temporal resolution. We used these observations in conjunction with new computer vision algorithms to automatically detect when two honeybees engage in trophallaxis. Compiling this information into a time-aggregated social interaction network revealed striking differences in the connectivity between individual bees. We will discuss whether this diversity has possible functional consequences with respect to the remarkable ability of honeybees to establish and maintain division of labor at the colony level while being faced with environmental changes.