P040

Social interaction networks and pathogen-induced behavioural defences in ants

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Social insects live in dense, highly interactive groups of closely related individuals. They are therefore particularly vulnerable to infection by pathogens and have evolved numerous collective defences to prevent both entry and spread of pathogenic agents into colonies. For example, there is increasing evidence that the spatial and behavioural compartmentalisation arising from division of labour in many social insect colonies also serves to decrease the risk of pathogen transmission between functional units that interact little with one another thus ultimately protecting the queen and the brood from infections originating from outside ('organisational immunity'). Beyond the prophylactic aspects of organisational immunity, social insects could also benefit from modifying their interaction patterns upon entry of a pathogen into a colony to further reduce its transmission, e.g. by increasing compartmentalisation even more. We investigated the possible existence of such pathogen-induced organisational immunity in the ant *Lasius niger*. Using an automated tracking system allowing the simultaneous monitoring of all individuals in a colony for extensive periods of time, we recorded the movement and interactions of all workers before and after infection of certain colony members with the generalist entomopathogenic fungus *Metarhizium brunneum*. To relate observed interactions to actual pathogen transmission, we quantified the pathogen load of all workers, the queen and the brood at the end of the experiment (i.e. 9 days after infection) using real-time polymerase chain reaction. We will describe how individual behaviour and social interaction networks changed upon introduction of the pathogen into colonies, and how this might affect pathogen spread and the final outcome of infection events.