

OR356*The impact of social immunity on fungal pathogen adaptation***Miriam Stock**, Anna V. Grasse, Sylvia Cremer

The armsrace between hosts and pathogens is characterized by continuous adaptations of both players in a co-evolving system. In social insect hosts, these adaptations do not only include the hygiene behaviour and physiological immune system of the individual group members, but also their collectively performed, social disease defences ranging from sanitary behaviours, use of antimicrobials and organisational adaptations. We performed an experimental evolution using the Argentine Ant, *Linepithema humile*, as a host and the general insect pathogenic fungus *Metarhizium* as a pathogen. We allowed pathogen adaptation over 10 serial host passages to two different evolution regimes: (1) only individual host immunity in a single ant treatment, and (2) simultaneously acting individual and social immunity in a social treatment, in which the exposed ant was accompanied by two healthy nestmates. We found that the killing rate of the pathogen increased under both evolution regimes, yet at different dynamics. Testing the evolved strains that evolved under either the single or the social regime under both single and social current rearing conditions in a full factorial design revealed that the additional collective defences in insect societies add new selection pressures for their coevolving pathogens that compromise their ability to adapt to its host at the group level. To our knowledge, this is the first study directly measuring the influence of social immunity on pathogen adaptation.