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Life-history trades-offs and within-host competition in honeybee brood parasites

Sophie Evison, Annette Jensen, William Hughes

Many parasite infections consist of multiple parasite strains with conflicting interests. The resulting within-host competition between a genetic diversity of parasites is predicted to result in, and select for, increased virulence. Understanding the dynamics of within-host competition is therefore important when considering disease epidemiology. Currently, empirical studies of the evolution of parasites in social insects is very limited, but considering that social insect colonies are often exposed to multiple parasites which may compete within the host, understanding these dynamics is important for understanding how social insects manage disease. Using honeybees and multiple strains of their fungal brood parasite, *Ascosphaera apis*, we tested the prediction that increased within-host genetic diversity of parasites will heighten competition, resulting in increased virulence and decreased parasite fitness. We were also interested in the precise within-host dynamics between competing strains of the parasite, and tracked the course of an infection using quantitative PCR. The results suggest that different strains of this parasite have evolved different life history strategies, which is reflected by their virulence when infecting alone. However, when in competition with other strains, their differential strategies result in variable outcomes in terms of virulence evolution. The consequences of this for disease management social insects will also be discussed.