Susceptibility to infection is not explained by sex or differences in tissue tropism across different species of *Drosophila*

Understanding factors explaining both intra and interspecific variation in susceptibility to infection by parasites remains a key question in evolutionary biology. Within a species variation in susceptibility is often explained by differences in behaviour affecting exposure to infection and/or resistance affecting the degree by which parasite growth is controlled (Roy & Kirchner, 2000, Behringer et al., 2000). This can vary between the sexes (Kelly et al., 2018) and may be explained by the ability of a parasite to attack different organs or tissues (Brierley et al., 2019). However, what goes on within one species is not always relevant to another, making it unclear when patterns can be scaled up and generalised across species. This is also important to understand when parasites may jump hosts, or identifying species that may be susceptible to a host jump (Longdon et al., 2015). Phylogenetic distance between hosts is often an important factor explaining susceptibility to a particular parasite in plant and animal hosts (Gilbert & Webb, 2007, Rodrigues Faria et al., 2013).

In two separate experiments Roberts and Longdon (Roberts & Longdon, 2022) investigated how sex and tissue tropism affected variation in load of *Drosophila* C Virus (DCV) across multiple *Drosophila* species. DCV load has been shown to correlate positively with mortality (Longdon et al., 2015). Overall, they found that load did not vary between the sexes; within a species males and females had similar DCV loads for 31 different species. There was some variation in levels of DCV growth in different tissue types, but these too were consistent across males for 7 species of *Drosophila*. Instead, in both experiments, host phylogeny or interspecific variation, explained differences in DCV load with some species being more infected than others.

This study is neat in that it incorporates and explores simultaneously both intra and interspecific variation in infection related life-history traits which is not often done (but see (Longdon et al., 2015, Imrie et al., 2021, Longdon et al., 2011, Johnson et al., 2012). Indeed, most studies to date explore either inter-specific differences in susceptibility to a parasite (it can or can’t infect a given species) (Davies & Pedersen, 2008, Pfenning-Butterworth et al., 2021) or intra-specific variability in infection related traits (infectivity, resistance etc.) due to factors such as sex, genotype and environment (Vale et al., 2008, Lambrechts et al., 2006). This work thus advances on previous studies, while at the same time showing that sex differences in parasite load are not necessarily pervasive.

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