

Title: Effects of host sex and body size on *Schistocephalus* infection susceptibility and plerocercoid growth in three-spined sticklebacks

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Abstract

Parasites do not affect all individuals equally, and both the level of infection and the severity of the effects that parasites have on hosts can be influenced by pre-existing host variation within populations. Host sex and body size are two potentially important factors that potentially influence the interactions of hosts with parasites, affecting the susceptibility to infection, as well as influencing the subsequent growth and development of parasites. Plerocercoid larvae of the cestode *Schistocephalus solidus* often impact the health, growth and development of three-spined sticklebacks *Gasterosteus aculeatus* in natural populations. We used experimental infection techniques to examine how pre-existing variation between individual stickleback hosts influences the outcome of *S. solidus* infections. Sticklebacks that varied in body size and sex – determined non-invasively by PCR analysis of a sex-linked marker – were exposed experimentally to controlled doses of infective *S. solidus* parasites, and the consequences of each host factor for infection susceptibility and parasite growth, as well as a range of indicators of host health and development, were quantified to determine their influence the emerging infection phenotype. Here we report the findings of this study, and also investigate the implications of host size and sex for the fecundity of adult parasites derived from plerocercoids growing in hosts of different sizes and sex. Our results provide support for the hypothesis that pre-existing host differences can influence the progression of disease, and have implications for host-parasite interactions in the face of systematic changes in host biology that may occur under altered ecological conditions, for example under changing climates. (253 words)